volume 49:number 2
2016 fall

ROM

MAGAZINE *of the* ROYAL ONTARIO MUSEUM

ROM GLASS
FROM BACCARAT TO CHIHULY
p. 26

TROPICAL PARADISE
BIODIVERSITY AND EXTINCTION IN THE CARIBBEAN
p. 29

MUSEUM RESEARCH
HELPING TO GUIDE NASA'S ASTEROID MISSION
p. 31

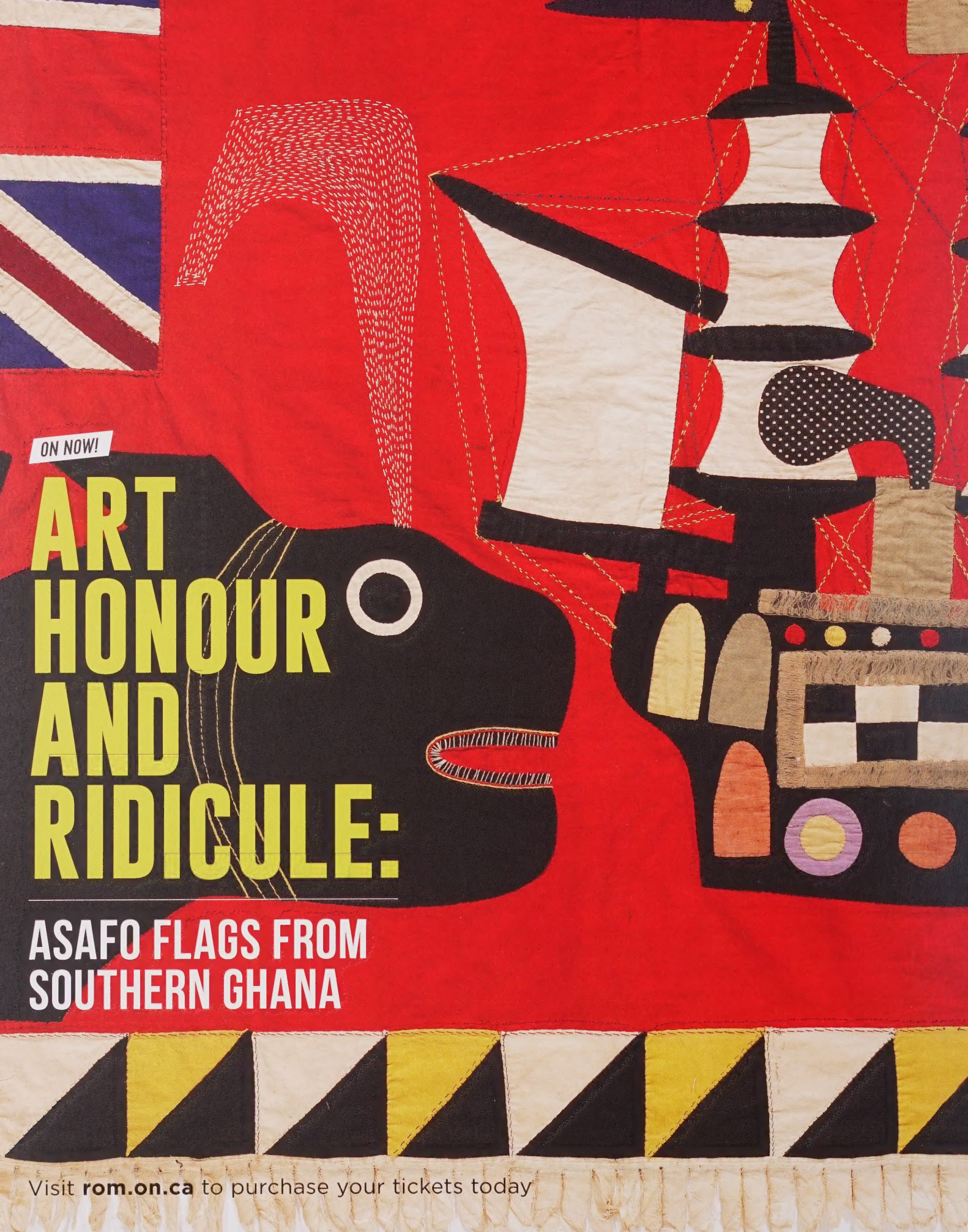
THE CULTURE AND TRADITION OF

ASAFO FLAGS

ART, HONOUR, AND RIDICULE p. 22

FALL 2016
Display until January 23, 2017
$5.95 CAN

7 72006 86280 6 03


ON NOW!
ART HONOUR AND RIDICULE:
ASAFO FLAGS FROM SOUTHERN GHANA
Visit rom.on.ca to purchase your tickets today

ON THE COVER
Asafo flag dancer from southern Ghana.

contents

Fall 2016
volume 49, number 2

Visit the ROM Boutique to find art, books, stationery, prints, and apparel. **p. 38**

Chihuly, Volumes 1 & 2 (Set), 1968-2014 $172.

departments

3 FIRST WORD
by Josh Basseches

4 CALENDAR
Upcoming ROM events

5 MEMBER NEWS

9 DISPATCHES

13 INSIDER PROFILE
Brendan Edwards

14 WORLD VIEWS

15 BEHIND THE SCENES
There's a whale in our compost!

16 PROFILE
Jameel Jaffer on Contemporary Culture

17 HIDDEN SPACES
Mineralogy Lab

18 BACKYARD BIO
Herpetology in the City

20 ASK AN EXPERT
Meteors & Meteorites

34 ROM TRAVEL
Join fellow Members on a journey to Japan

36 MY ROM
The ROM through the eyes of Ben Mulroney

37 ROM STYLE
Original Chihuly designs

39 ROM GOVERNORS
Support your Museum

44 EXHIBIT A
Earl of Pembroke's Armour

featured stories

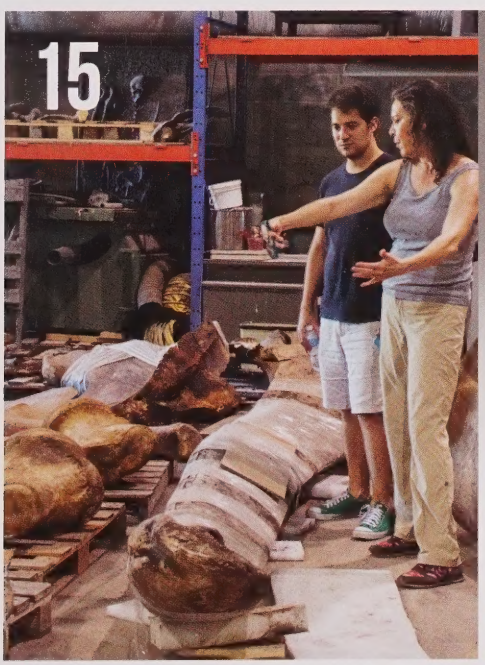
26 GLASS COLLECTIONS
Shattering the mystery of the ROM's glass collection

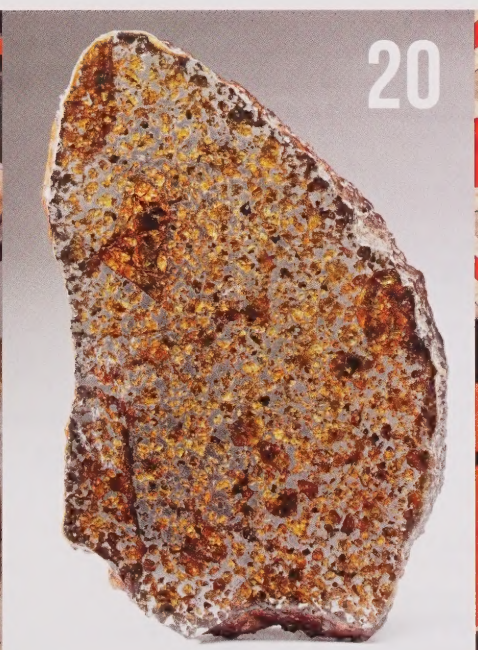
29 TROPICAL DIVERSITY
Unique bats in the Caribbean and what makes them so special

31 DEEP IMPACT
How the ROM is helping NASA study an oncoming asteroid

COVER STORY

22 ASAFO FLAGS
Exploring the rich culture of the Fante people in Ghana





SILVIA FORNI

CURATOR, AFRICAN ARTS AND CULTURE

Silvia is the Curator for the African collection. Her research focuses on the significance of art objects and material culture. She is also an Assistant Professor at the University of Toronto Department of Anthropology.

BURTON K. LIM

ASSISTANT CURATOR, MAMMALOGY

Burton has travelled to over 22 countries conducting his fieldwork. He is also participating in the International Barcode of Life project, a genetic reference system for the identification and discovery of mammals. He is also part of the ROM's Blue Whale project.

IAN NICKLIN

TECHNICIAN, EARTH SCIENCES

Ian works with the rocks, minerals, and meteorites collection in the Centre of Earth and Space at the ROM. Presently, his work is focused on the integration of the 21,000-piece Kirwin Collection of ores and minerals into the ROM's collections.

CHRISTINE TOVEE

AEROSPACE ENGINEER/ TECHNOLOGY LEADER, ROM VOLUNTEER

Christine has a master's in aeronautics and astronautics from MIT. Formerly, Tovee was Vice President for Research and Technology as well as the Chief Technology Officer for Airbus Group, Inc. Her interests include complex systems, extreme sports, art, basketball, and travel.

CONTACT US

Questions? Comments? Email us at magazine@rom.on.ca.

VISIT US

Royal Ontario Museum
100 Queen's Park
Toronto, ON M5S 2C6
416.586.8000
rom.on.ca
info@rom.on.ca

HOURS
Saturday – Thursday:
10:00 a.m. to 5:30 p.m.
Friday: 10:00 a.m. to 8:30 p.m.

ROM LIBRARY & ARCHIVES
Public hours
Monday – Friday:
10:00 a.m. to 5:00 p.m.

ADMISSION PRICES
ROM Members: FREE*
Children 3 and under: FREE
Youth (4 to 14 years): $14
Students (under 18) and Seniors (65+): $15.50
Adults: $17

Feature exhibitions are an additional $11 for adults, $10 for seniors/students, and $6 for children.

Admission is free on Tuesdays for Canadian post-secondary students with ID.

Museum and Arts Pass Program participant.

**All adult Members must present a valid membership card and photo ID. Membership cards are not transferable except for RPC Members.*

ROM MAGAZINE

ASSISTANT VICE PRESIDENT, PR AND PUBLICATIONS
Marnie Peters

CONTENT MANAGER
Douglas Thomson

ACTING ART DIRECTOR
Rose Pereira

PRODUCTION EDITOR
Sheeza Sarfraz

PHOTOGRAPHY
Brian Boyle

Published through the generosity of the Louise Hawley Stone Charitable Trust.

© Royal Ontario Museum, 2016.

Indexed in the Canadian Periodical Index and the Canadian Magazine Index, and available online in the Canadian Business & Current Affairs Database ISSN 1911-947X and through Thomson Gale.

Canadian Publications Agreement #40068986.

Subscription cost (four issues) $20 including HST; outside Canada add $8 for postage and handling; single copies cost $5.95 plus HST. Contact Julie Govan at julieg@rom.on.ca to purchase a subscription.

The ROM is an agency of the Government of Ontario.

MIX
Paper from responsible sources
FSC® C101537
FSC www.fsc.org

ROM magazine is printed on paper from well-managed forests and is chlorine and acid free.

HONORARY PATRONS
His Excellency the Right Honourable David Johnston, C.C., C.M.M., C.O.M., C.D., Governor General of Canada
The Honourable Elizabeth Dowdeswell, O.C., O.Ont., Lieutenant Governor of Ontario

BOARD OF TRUSTEES
Martha Durdin (Vice Chair)
Mohammad Al Zaibak
Francis Chou
David DeAbreu
Anne Lindsey
Liz Mitchell
Kevin Morris
Nita Reed
Elaine Roper
Ray Sharma
Keith Spence
Frederic Waks
Tim Wilson

EX-OFFICIO
Josh Basseches
Meric Gertler
Judy Goldring

BOARD OF GOVERNORS
Robert E. Pierce (Chairman)
Linda Hasenfratz (Vice-Chair)
Shreyas Ajmera
Salvatore (Sal) M. Badali
Jennifer Ivey Bannock
John Bianchini
Bonnie Brooks
Stephen Bowman
Mary Anne Bueschkens
Tye W. Burt
Michael E. Detlefsen
Victor Dodig
Thor Eaton
W. Robert Farquharson
Anna-Maria Kaneff
Robert Keilty
Michael Lee-Chin
Patricia Olasker
Francis Shen
Stephen Smith
Cathy Spoel
Joseph (Joey) M. Tanenbaum, C.M.
James C. Temerty, C.M.
V. Prem Watsa
Richard S. Wernham
Alfred G. Wirth

EX-OFFICIO
Josh Basseches
Bonnie Brooks
Frank Potter

HONORARY GOVERNORS
Frank Potter (Chairman)
Susanne Loewen (Vice Chair)
Brenda McCutcheon (Vice Chair)
Rudolph (Rudy) Bratty
Jack Cockwell
Fredrik S. Eaton, O.C., O.Ont.
Robert Gillespie
Kenneth W. Harrigan
Patricia Harris
Gwen Harvey
Martha J. Hogarth
Richard M. Ivey, C.C., Q.C.
The Hon. Henry N.R. Jackman
Thomas Kierans
Donald R. Lindsay
Elsie Lo
Stephens B. Lowden
Frank Milligan
Dixie Anne Montgomery
Joan Randall
Wendy Rebanks
Flavia C. Redelmeier
John A. Rhind
Donald M. Ross, O.C.
Harriet Walker
Lynton R. Wilson

ROM SENIOR LEADERSHIP
Josh Basseches (Director & CEO)
Nick Bobrow (Deputy Director, Operations & Chief Financial Officer)
Mark Engstrom (Deputy Director, Collections & Research)
Sandy Bourne (Chief Marketing & Communications Officer)
Dan Sibley (Chief Human Resources Officer)
Doug Currie (Vice President, Department of Natural History)
Chen Shen (Vice President, Department of World Cultures)

ROM GOVERNORS SENIOR LEADERSHIP
Susan Horvath (President & CEO)
Scott Forfar (Vice President & Chief Operating Officer)
Ulrica Jobe (Vice President, Philanthropy & Corporate Partnerships)
Kirsten Kamper (Vice President, Annual Giving)
Denise Dias (Associate Vice President, Marketing & Communications)

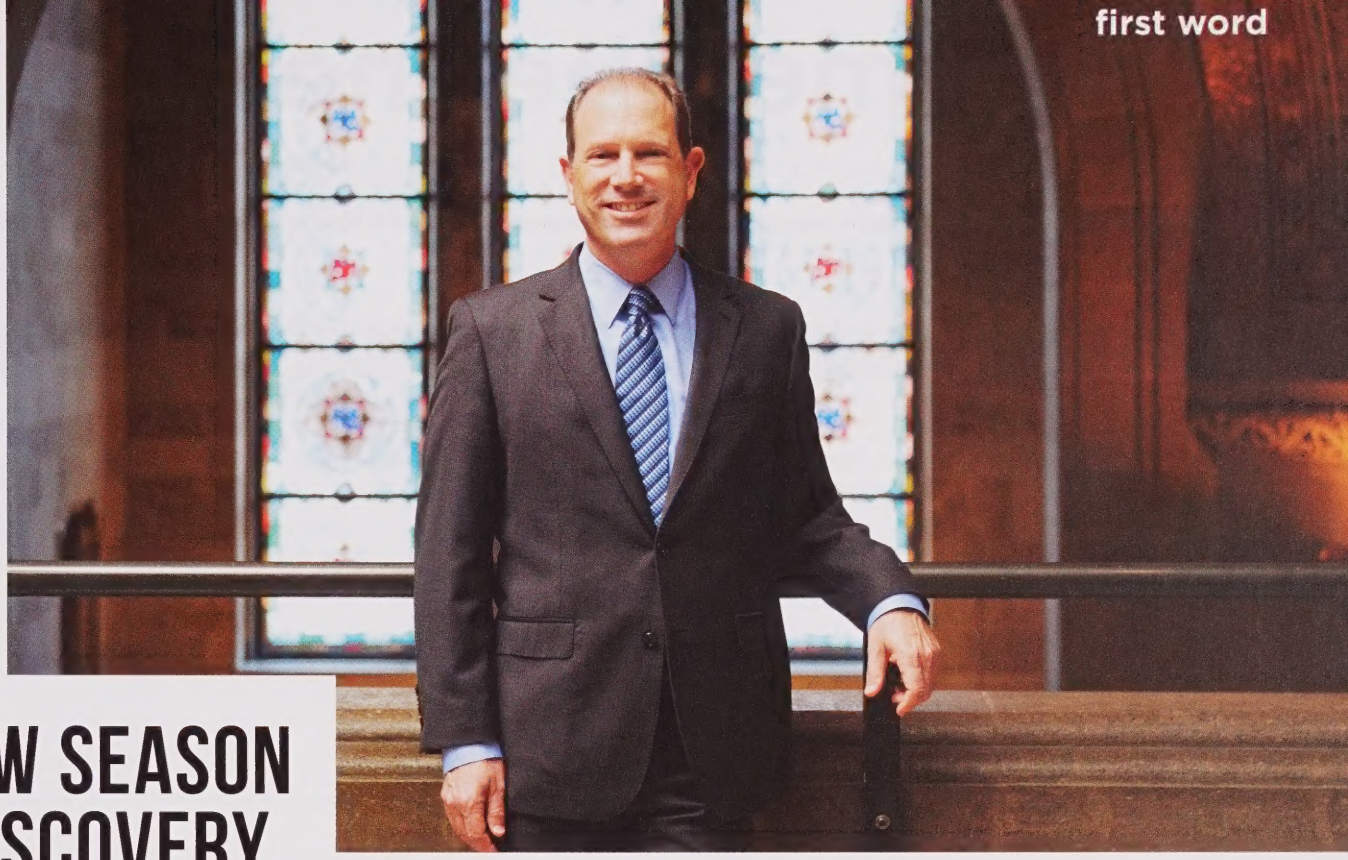
STAY CONNECTED

facebook.com/royalontariomuseum
@romtoronto
@ROMtoronto
@ROMtoronto

SUPPORT YOUR ROM

Your generous contributions help bring exhibitions, programs, and galleries to life.

rom.on.ca/support
416.586.5660
giving@rom.on.ca



A NEW SEASON OF DISCOVERY

This fall, art, culture and nature come alive in our galleries

For generations of visitors, the ROM has sparked curiosity and inspired the passion to learn about our world. What distinguishes the ROM from virtually all other North American museums is the breadth of its collections, research, and intellectual mandate. With more than six million objects and specimens in our collection, the ROM is truly an encyclopaedic institution—one that is able to interpret the story of the world!

This fall, we unveil a new season of discovery for our visitors—one in which art, culture, and nature come alive in our galleries and through our special exhibitions and events, revealing new ideas and unexpected connections.

The ROM's newest exhibition, *Art, Honour and Ridicule: Asafo Flags from Southern Ghana*, highlights Asafo culture of the Fante community in Ghana by examining the colourful flags and art objects of its militia companies. The flags' striking colours and vivid images portray variations on cultural proverbs that demonstrate the ideology of the Fante people and their militia companies. The exhibition curator, the ROM's Dr. Silvia Forni, explains that, in addition to their military function, these companies have historically exerted a strong political influence. They served as a power base that was competitive with the ruling elite. These groups were also responsible for major public works and participated in ceremonies and celebrations where they performed with the flags to entertain audiences.

This November, the Museum also looks forward to welcoming the constitutional lawyer and civil liberties advocate Jameel Jaffer to deliver the ROM's annual Eva Holtby Lecture on Contemporary Culture. Jaffer's talk will challenge us to explore the phenomenon of official secrecy and the repercussions of allowing democratic governments to withhold information on national security policy.

On the research side, the ROM's Earth Sciences department has been working with the Canadian Space Agency (CSA) on a significant space exploration project. The CSA leads Canada's contribution to NASA's OSIRIS-REx probe. Launched in early September, OSIRIS-REx will rendezvous with the asteroid Bennu, before a planned return to Earth in 2023 carrying a sample of the asteroid for analysis.

The ROM is proud to acknowledge its curatorial team, led by Dr. Kim Tait, Teck Chair of Minerology, which provided research support to the CSA mission based on the Museum's world-class collection of meteorites. Our meteorites have played a pivotal role in helping the international research team to prepare for this interstellar mission, one intended to help answer fundamental questions about our solar system's formation, how life began, and even how we can avoid asteroids colliding with the Earth.

I hope the ROM's fall exhibitions and programs inspire you to visit soon and discover something new about our world.

JOSH BASSECHES
ROM DIRECTOR AND CEO

SEE IT

ART, HONOUR, AND RIDICULE
Visit **rom.on.ca/en/exhibitions-galleries** to see a video of the Asafo flags in action.

DON'T MISS

CHIHULY
On now

member news

calendar / special events / special offers / meet a member

OCTOBER

ANNUAL GREEK LECTURE

ROMSpeaks

PERGAMON AND THE HELLENISTIC KINGDOMS OF THE ANCIENT WORLD
October 4
Eaton Theatre
Members: $18
Public: $20
Join Dr. Carlos A. Picón, head of the Greek and Roman art department at the Metropolitan Museum of Art, as he takes us through the city of Pergamon. Picón will discuss the rich diversity of art forms that arose through the patronage of the royal courts of the Hellenistic kingdoms.

GLASS: VIRTUAL, REAL
October 14
Eaton Theatre
Free with RSVP
Sculptor and educator Koen Vanderstukken investigates how postmodern art has brought glass to the forefront as a breakthrough art medium due to its intriguing qualities.

THE ART OF JAPAN
October 16
Classroom, Level 1
Members: $72
Public: $80
Join ROM Educator George Hewson for an in-depth workshop that focuses on the fundamentals of Japanese art. This full day includes a guided visit to the special exhibition *A Third Gender: Beautiful Youths in Japanese Prints*. Lunch is included. Please note that this course includes mature content and is not recommended for guests under the age of 18.

FIND OUT MORE

Visit **rom.on.ca/whatson**
Call 416.586.5797

ROMSpeaks

INTERNATIONAL ARCHAEOLOGY DAY LECTURE: EARLY EGYPT: CLIMATE, CHAOS, AND CIVILIZATION
October 18
Eaton Theatre
Members: $18
Public: $20
Dr. Fekri Hassan will discuss his study of the mystery of the emergence of Egyptian civilization, tracing the impact of climate change on desert communities and the struggle in the Nile Valley to overcome the chaos caused by climatic fluctuations by establishing an orderly state society.

MASTERS OF DREAMS: JEWELLERS OF THE AMERICAS
October 21
Eaton Theatre
Free with RSVP
Join us for a screening of this episode of a four-part documentary on some of the most legendary jewellery houses around the world.

ROMSpeaks

DAWN OF LIFE SERIES: *MASS EXTINCTIONS, MISSING LINKS & EXTRA-TERRESTRIALS*
October 25
Eaton Theatre
Members: $18
Public: $20
How does the treasure trove that is the fossil record help us to understand the history of life on Earth? How could the study of evolution help humanity unravel our place in the cosmos? Delve into life's big questions with palaeontologist Dr. Simon Conway Morris of the University of Cambridge, a Fellow of the Royal Society.

NOVEMBER + DECEMBER

ROMSpeaks

ARCHAEOLOGY UNDERWATER: THE SEARCH FOR HMS EREBUS
November 2
Samuel Hall ✿ Currelly Gallery
Free with RSVP
Join Marc-André Bernier, manager of Parks Canada's Underwater Archaeology Team, for a talk on the discovery of the shipwrecked HMS *Erebus* and the challenges that underwater archaeologists will face when they start the in-depth study of the site where the ship was discovered. Lead Exhibit Patron: The W. Garfield Weston Foundation.

CHIHULY: ART & IMPACT
November 8
Eaton Theatre
Members: $18
Public: $20
Explore the life, work, and global impact of Dale Chihuly with independent curator and historian Tina Oldknow.

EVA HOLTBY LECTURE ON CONTEMPORARY CULTURE: *GOING DARK*
November 15
Eaton Theatre
Members: $18
Public: $20
Constitutional lawyer and civil liberties advocate Jameel Jaffer will explore the phenomenon of official secrecy and the repercussions of national security policies. The Eva Holtby Lecture is generously supported by the Holtby and Schury families.

ROMSpeaks

WPY KEYNOTE PRESENTATION: *AN EVENING WITH A MASTER: PAUL NICKLEN*
November 22
Eaton Theatre
Members: $18
Public: $20
Paul Nicklen, a globally acclaimed Canadian-born photographer and marine biologist, has been documenting both the beauty and the plight of our planet's polar regions and oceans for over 20 years. Read more about the upcoming exhibition and event on page 11.

ROMSpeaks

THE EDIACARA BIOTA AND THE FIRST MASS EXTINCTION OF COMPLEX LIFE
December 13
Eaton Theatre
Members: $18
Public: $20
The Cambrian Explosion 540 million years ago represents the greatest expansion in animal diversity on Earth. Prior to this event, however, terrestrial life included a diverse suite of multicellular organisms. Hear palaeontologist Dr. Marc Laflamme discuss the exploration and the disappearance of the Ediacara biota, the oldest large and complex organisms in the fossil record, which are well represented in Canadian fossil deposits from Newfoundland and northwestern Canada.

ROM FOR THE HOLIDAYS

December 26 to January 8
Enjoy special programming and celebrate the holidays with us!

Member Previews

WILDLIFE PHOTOGRAPHER OF THE YEAR

November 11, 2016
10 a.m. to 6 p.m.
November 12, 2016
10 a.m. to 12 p.m.

Photo: David Doubilet: *Turtle Flight*.

GIVE A ROM MEMBERSHIP

This holiday season give the gift of ROM membership. Your friends and family will enjoy unlimited free admission to galleries and exhibitions, and exclusive benefits all year long.

MEMBERS:
GIVE AN UNLIMITED ROM MEMBERSHIP AND SAVE* $20

*ROM Members save up to $20 on select gift membership levels. Purchase gift memberships at **rom.on.ca/members** or call **416.586.5700**. Use promo code MEMGIFT to save.

RENEW YOUR MEMBERSHIP

STUDENT
1 yr $54

INDIVIDUAL
1 yr $97

NON-RESIDENT
1 yr $102

SENIOR FAMILY
1 yr $145

FAMILY OR DUAL
1 yr $149

ROM SOCIAL
1 yr $149

CURATORS' CIRCLE
1 yr $189

MUSEUM CIRCLE
1 yr $323

DIRECTOR'S CIRCLE
1 yr $626

YOUNG PATRONS CIRCLE (YPC)
$600+

ROYAL PATRONS CIRCLE (RPC)
$1,800+

CONTACT US
416.586.5700

EMAIL
membership@rom.on.ca

WEB
rom.on.ca/members

SAVE 20%
MEMBER HOLIDAY SHOPPING WEEKEND

December 3, 4, & 5, 2016

Start your holiday shopping early at the ROM's annual Member Holiday Shopping Weekend. Receive a special discount of 20% off regularly priced merchandise.* This special offer applies at ROM Boutique and at the Exhibition Boutique, which features an array of *CHIHULY* merchandise. You'll be sure to find the perfect gift or something special for yourself. Present your ROM membership card at time of purchase to receive your discount.

*EXCLUSIONS APPLY. ROM MEMBER DISCOUNT DOES NOT APPLY TO ALREADY DISCOUNTED MERCHANDISE, CHIHULY LIMITED EDITION GLASS, BLANKETS, OR PRINTS. THIS SPECIAL 20% DISCOUNT CANNOT BE COMBINED WITH YOUR REGULAR ROM MEMBER DISCOUNT. SPECIAL 20% OFF DOES NOT APPLY TO PREVIOUSLY PURCHASED MERCHANDISE.

ROM FRIDAY NIGHT LIVE

The ROM's Friday Night Live, presented by Ford of Canada, is back this fall with a fresh lineup of themes and DJs, and a slew of fantastic food vendors to choose from. Tickets are available at **rom.on.ca**. Tickets will also be sold at the door starting at 7:00 p.m. Space is limited so arrive early!

September 30	*Nuit ROM*
October 7	*Thanks Canada*
October 14	*Beer*
October 21	*Fashion*
October 28	*Halloween*
November 4	*Farm/Country in the City*
November 11	*Tribute*
November 18	*WPY*
November 25	*Finale*
December 31	*Encore: ROM NYE*

Supporting Sponsor
PERONI ITALY

Media Partner
NOW

SAVE THE DATE

FAMILY HOLIDAY GATHERING

Sunday, December 4, 2016, 10 a.m. to 2 p.m.

AN EXCLUSIVE EVENT FOR MUSEUM CIRCLE, DIRECTOR'S CIRCLE, YOUNG PATRONS CIRCLE, ROYAL PATRONS CIRCLE, AND DISCOVERY CIRCLE MEMBERS

Celebrate the holidays at our annual Family Holiday Gathering with fun crafts and activities, festive treats, and a visit with Santa. Details will be sent by e-mail in November with registration information.

JOIN IN!
IF YOU ARE NOT CURRENTLY A MUSEUM CIRCLE OR DIRECTOR'S CIRCLE MEMBER, UPGRADE TODAY BY CALLING 416.586.5700.

FREE CINÉ+ FILM AT THE CANADIAN MUSEUM OF HISTORY

ROM MEMBERS RECEIVE FREE ADMISSION TO A CINÉ+ FILM WITH THE PURCHASE OF AN ADULT OR CHILD MUSEUM ADMISSION TICKET. OFFER VALID UNTIL JANUARY 15, 2017. VISIT **ROM.ON.CA/MEMBERSHIPOFFERS**, PRINT THE PDF, AND PRESENT IT AT THE CANADIAN MUSEUM OF HISTORY BOX OFFICE TO RECEIVE THIS OFFER.

Discover the events, experiences, people, and objects that have shaped this nation's history. Take in the beauty of this architectural gem and its spectacular setting on the banks of the Ottawa River. Marvel at the world's largest indoor collection of totem poles and explore the traditions and achievements of Canada's First Peoples. Tour the many exhibitions, be a kid again at the Children's Museum, and live the ultimate cinema experience at CINÉ+.

ROM MEMBERS GET FREE ADMISSION

THEMUSEUM
November 5 & 6, 2016

January 21 & 22, 2017

ART GALLERY OF ONTARIO
November 5 & 6, 2016

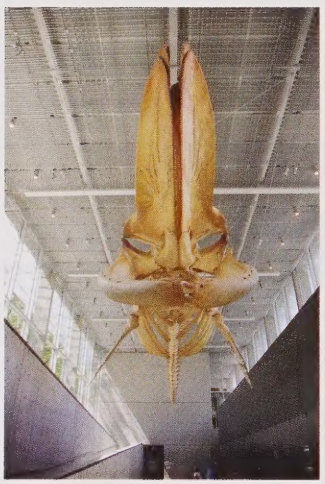
RECIPROCAL ADMISSIONS PROGRAM FOR ROM MEMBERS

New!

ALLIANCE OF NATURAL HISTORY MUSEUMS OF CANADA

ROM Members will be granted free general admission or discounted admission, or a gift shop discount, at the participating natural history museums. Present your valid ROM membership card(s) upon arrival. Visit **rom.on.ca/members** to find out more.

- **Beaty Biodiversity Museum**, Vancouver
- **Canadian Museum of Nature**, Ottawa
- **Manitoba Museum**, Winnipeg
- **New Brunswick Museum**, Saint John
- **Nova Scotia Museum of Natural History**, Halifax
- **Royal Saskatchewan Museum**, Regina
- **Yukon Beringia Interpretive Centre**, Whitehorse



ROMWALKS FOR MEMBERS

Join fellow Museum members and see Toronto in a whole new light. Registration is required as space is limited. For more information go to **rom.on.ca/members/events**.

Look for the purple ROMwalk umbrella at the meeting places.

MEMBER EVENTS

SPRING FLING

The Museum hosted its first annual Member Spring Fling this past May in the Samuel Hall ❖ Currelly Gallery. Josh Basseches, Director and CEO, joined Members at the reception. The event included a Q&A period with Josh, where Members discussed accessibility, engagement, and education.

For more information on Member events go to **rom.on/members/events**

MEMBER BENEFITS

FAST FACTS

Quietest times: Friday evenings (outside of Friday Night Live) and weekdays after 2 p.m. during the school year

Family Members visit most often on weekends to see the dinosaurs and mammals, as well as to play in the Hands-on Biodiversity and Discovery Galleries

30 galleries with over 30,000 artifacts, which are rotated often so each trip is a new experience

The longest running Member has had a membership for 63 years!

THANK YOU TO OUR MEMBERS

We hope you're enjoying your membership and have been able to take advantage of all the benefits it offers.

Our Members are an integral part of the social fabric that makes the ROM one of the world's leading museums of art, culture, and nature. Your support provides essential funding for educational programs, research, collections, and community outreach.

To ensure you get the most from your membership, you may have noticed more emails about the great programs, events, and offers coming to your inbox. We're working to add more activities and programs, and Members are responding so quickly that events are filling up almost immediately, which is allowing us to continue to expand and increase our Member offerings.

We are also working to get more input from Members through online surveys and Member focus groups—all in an effort to add even more value to your membership.

This year saw a number of Member events, including lectures with Canadian Space Agency astronaut Jeremy Hanson and award-winning Egyptian-born Canadian journalist, war correspondent, and author Mohamed Fahmy. In December, we held our annual Family Holiday Gathering, as well as the well-attended previews for the openings of *Tattoos* and *CHIHULY*.

We have another extraordinary year planned, full of fascinating discoveries, awe-inspiring exhibitions, and immersive learning experiences. Remember, as a ROM Member you have unlimited access to galleries and special exhibitions, as well as exclusive previews and events, all year long.

Thank you for being part of the ROM Community.

Sincerely,
The ROM Membership Team

MEMBER PROFILE

Dedicated Member

SOCIAL MEMBER **JACKY HOOD** SHARES HER FAVOURITE ROM EXPERIENCES, INCLUDING HER ITINERARY FOR A PERFECT DAY

Jacky viewing the *CHIHULY* exhibition.

1 How often do you visit the ROM?
About once a month, but more if there's a special event or an exhibition I'm excited about seeing, like *CHIHULY* and the Drawing the Line Member event with Mohamed Fahmy.

2 What do you consider the greatest benefit to your ROM membership?
I have a social membership so I get to bring friends and introduce them to the ROM and catch up with them at the same time! I can also bring a date, which is a great way to spark conversation and discover similar interests.

3 What word can be used to describe your experience at the ROM?
Relaxing. It's a great way to wind down from a hectic week and wander the galleries, marveling at the history and other cultures.

4 Are there specific places you find yourself coming back to visit?
The Teck Suite of Galleries: Earth's Treasures. It really puts things in perspective—having the opportunity to view rocks and gems which have been around for billions of years, knowing they will still be here long after we are not.

5 Is there a favourite object that stands out to you as something you would like to own?
The "leaf" gold and diamond necklace in the Teck Galleries—I would love to try it on just once! It's an incredible work of wearable art and exquisite craftsmanship.

6 If you were to plan a perfect day out with a friend, what would you plan to do before and after your time spent at the ROM?
We would start with brunch at the Gardiner Bistro and a visit to their latest exhibit, then lots of time at the ROM, and afterward, champagne cocktails at the Park Hyatt rooftop bar.

7 Have you had any fun and interesting experiences at the ROM that we haven't asked about?
The dinosaur-themed night at Friday Night Live! Being able to drink "with" the dinosaurs was a surreal and fun experience. The only thing that could have improved the experience would have been to have the *T. Rex* mixing my martini! ◘

Dale Chihuly, *Persian Trellis*, 2016. Royal Ontario Museum, Toronto. Photo by Roger Yip.

NEW ACQUISITION

The Maué Headdress

OTHERWISE KNOWN AS THE "RUSSIAN TRAVELLING HAT"

By **ARNI BROWNSTONE**

When she first asked the Museum to identify her feathered headdress, Jackalin O'Brien knew only that it was stored in a box labeled "Russian Travelling Hat" and that it belonged to her grandmother, who had died 30 years earlier at age 90.

The headdress is composed of several thousand brilliantly preserved feathers. Fine strips of unidentified organic material are wrapped around the lower half of each feather and anchored in place by further wrapping around a section of the netted-cord substructure. The colour palette is typical of Brazilian featherwork, and the feathers were gathered from birds indigenous to the region. Mark Peck, an ornithologist at the ROM, kindly identified the samples: red, yellow, and blue from several types of macaws (*Ara macao* and *Ara ararauna*); orange-red from toucans (*Aracari/Pteroglossus*); and black from curassows (*Mitu*).

Establishing a more precise understanding of the headdress's origins called for a specialist. In this regard, I am extremely thankful to Dr. Andreas Schlothauer for generously sharing his extensive knowledge. From his database of some 12,000 South American feathered objects he instantly identified two very similar headdresses, both of which are in the Five Continents Museum in Munich, Germany. The first was collected by the Bavarian explorers Carl Friedrich Philipp von Martius and Johann Baptist von Spix while visiting the Maué (Sateré-Mawé) Indians of Brazil in 1820.

Auguste Charles Eugène Napoléon de Beauharnais, the 2nd Duke of Leuchtenberg, collected the second headdress in Brazil when attending his sister's marriage to Dom Pedro I, the King of Brazil, in 1829. He likely acquired the headdress in 1829–30 from the German naturalist Georg Heinrich von Langsdorff, whom he met in Brazil. Langsdorff was the Russian Consul there and in the mid-1820s headed a Russian expedition that came into contact with the Maué. It is so similar to O'Brien's headdress that it was probably made at the same time and place.

Early 19th-century European observers noted that the Maué were famous for their feather articles and were important traders in that commodity; however, they have long since discontinued the practice of featherwork. The only examples that seem to have survived are the three feather headdresses noted above, and they stand among the very highest achievements in featherwork from the Americas.

The ROM is now very fortunate to own one of them. No doubt it will take a place of special importance in our galleries, offering viewers a benchmark for an exceedingly refined, but lost, art form. As to future research, perhaps the story behind our headdresses' former incarnation as a "Russian Travelling Hat" will surface in St. Petersburg, among Langsdorff's archival papers.

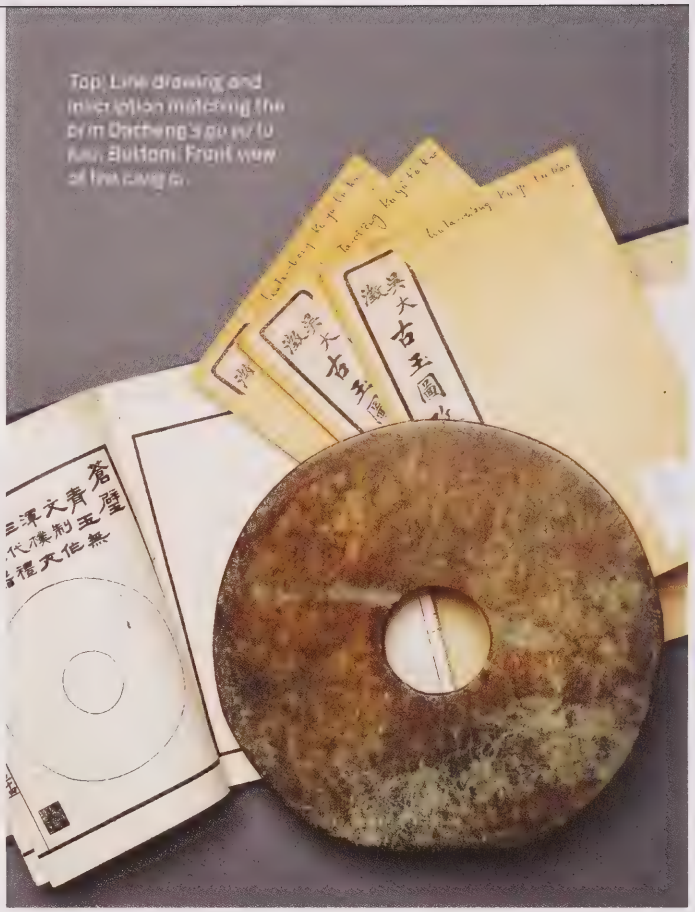
THE HEADDRESS IS COMPOSED OF SEVERAL THOUSAND BRILLIANTLY PRESERVED FEATHERS, EACH TRIMMED TO ABOUT THREE CENTIMETRES IN LENGTH.

Acc. no. 2015.86.1. This acquisition was made possible by the generous support of the Louise Hawley Stone Charitable Trust.

ROM RESEARCH

Wu Dacheng's Jade Cang Bi

HOW A JADE DISC THAT IS AT LEAST 4,000 YEARS OLD CAME TO THE ROM



Top: Line drawing and inscription matching the *bi* in Dacheng's *gu yu tu kao*. Bottom: Front view of the *cang bi*.

Anyone who walks into a museum at one point has asked how a certain artifact came to be part of the exhibits. Vice President, Senior Curator and Chairholder of the Bishop White Chair of East Asian Archaeology Chen Shen has documented the journey of Wu Dacheng's jade *cang bi* from its creation to the collection at the ROM. This research gained international recognition when *Orientations*, a magazine dedicated to publishing the latest scholarly research on Asian art, featured Chen's findings as the cover story of its April 2016 edition (orientations.com.hk).

The *bi*, as Chen explains, is a jade disc that serves a ritualistic purpose, going back at least 4,000 years. Wu Dacheng's *cang bi* became the latest jade addition to the ROM through a generous donation by Bernard Rasch, who received it from his aunt Cecile Hatskin in 2005. Examining one of the most interesting jade pieces the ROM has in its collection, Chen was immediately drawn to finding out how the *cang bi* came to Canada. What he determined was that the *bi* was created during the prehistoric Liangzhu culture (c. 3300–2400 BCE), and was likely buried with a member of the Liangzhu elite.

Wu Dacheng was a well known scholar and a high-ranking official in the Qing Court during the second half of the 19th-century. He was known for his collection of antiquities, including jade. It is likely that the *cang bi* came into Wu's possession sometime before 1889, remaining in his collection until his death in 1902. He included it in his influential book *gu yu tu kao* (Illustrated Study of Ancient Jades). The *bi* was then passed down to Wu Dacheng's youngest daughter, Wu Benjing, who in turn gave it to her only daughter, Fei Lingyi. Fei brought it with her when she moved from Shanghai to New York City in 1943. She then befriended Cecile Hatskin and gave her the *bi* before she moved from New York to Winnipeg.

It is intriguing to consider the people and lives behind these objects, and how such artifacts themselves travel though history, sometimes arriving at surprising destinations. Wu Dacheng's *cang bi* is a prime example.

ROMPRESS

NEW FROM ROM PRESS

Judaica: The Dr. Fred Weinberg and Joy Cherry Weinberg Collection

The Dr. Fred Weinberg and Joy Cherry Weinberg Judaica Collection represents the first presence of European Judaica in the permanent collections of the Royal Ontario Museum. The collection was intended to document Judaica as an expression of Judaism, and as a result, this book places an emphasis on artifacts documenting facets of Judaism.

This publication is intended for readers with a desire to know more about Judaism and Judaica in both cultural and stylistic contexts. It also acts as a suitable inspiration and guide for collectors interested in Judaica as a contextualized field of study—the objects represent aspects of Judaism and are not intended for consideration as mere *objets d'art*. **Available Fall of 2016. Members, $26.95; Regular, $29.95.**

ROMSPEAKS

Photographer Paul Nicklen will provide this season's WPY keynote presentation.

WILDLIFE PHOTOGRAPHER OF THE YEAR

Returning for its fourth year, the critically acclaimed *Wildlife Photographer of the Year* (WPY) exhibition opens on November 12, 2016. Each year showcases a brand new set of photographs that express the beauty of the world around us. From stunning landscapes to incredible macro shots of insects, colourful birds, and surreal natural events, this world-touring exhibition—the longest-running photography competition of its kind—celebrates the very best in nature photography. Paul Nicklen, born in Canada and raised on Baffin Island, is the 2012 overall winner and a 15-time finalist. Nicklen, an acclaimed *National Geographic* photographer, will provide this season's keynote presentation on November 22, 2016.

With over 100 breathtaking photographs, there is always something new to see. ***Wildlife Photographer of the Year* runs through March 19, 2017.**

ROM DINOSAUR ON NEW STAMP

Stamp collectors and dinosaur enthusiasts alike will love the new dinosaur-themed stamps revealed by Canada Post. The stamps are illustrated by palaeo artist Sergey Krasovskiy and depict five prehistoric creatures from Canada's distant past as they would be seen in their prey's or predator's eyes. Krasovskiy tells a unique story on each stamp. One of the dinosaurs chosen to be part of the series, *Acrotholus audeti*, was discovered and described by a team lead by ROM palaeontologist David Evans, James and Louise Temerty Endowed Chair of Vertebrate Palaeontology. *Acrotholus* was approximately 1.8 metres long and weighed about 40 kilograms. At 85 million years old, this two-legged herbivore is the oldest known bone-headed dinosaur in North America and possibly the world. The species name, *audeti*, honours Alberta rancher Roy Audet, who owns the land where the dinosaur's skull fossil was found. The dino's discovery was important because it helped fill a gap in the fossil record of the Late Cretaceous period and provided clues to the evolution of small plant-eating dinosaurs. **You can purchase the *Acrotholus audeti* stamp at your local Canada Post outlet or at canadapost.ca.**

Stamp: © 2016 Canada Post. Reprinted with permission.

LAST CHANCE

Don't miss the chance to experience the exploration of light, colour, and form in the work of internationally acclaimed artist Dale Chihuly. The art created by sand, fire, and human breath is a sensory adventure unlike anything experienced before. Chihuly's pieces bring together a centuries-old team approach to glass-blowing with his unique artistic vision—resulting in groundbreaking artworks. **The *CHIHULY* exhibition closes on January 8, 2017.**

NEWS

DEEPALI DEWAN WINS ARTS AWARD

The Canadian Community Arts Initiative named ROM Senior Curator of South Asian Visual Culture Deepali Dewan this year's recipient of the Excellence in Art Service award. The award recognizes the work of individuals who are committed to developing and enhancing the artistic and cultural experience of Canadians. Deepali has built important community relationships for research, collaboration, and development of various areas representing the South Asian community and is considered an authority in her field.

Deepali is also the author of *Embellished Reality: Indian Painted Photographs,* the editor of *Bollywood Cinema Showcards: Indian Film Art from the 1950s to the 1980s,* and co-author of *Raja Deen Dayal: Artist-Photographer in 19th-Century India.*

BISHOP WHITE LUNCHEON

Investing in Tomorrow: Building Canada's Asia Competence

TUESDAY, JANUARY 24, 2017, 11:30 A.M. TO 2:15 P.M.

Stewart Beck, President of the Asia Pacific Foundation of Canada, discusses Asian cultures, histories, languages, and business practices. For tickets, please call ROM Programs at 416.586.5797 or go to **rom.on.ca/programs**. Tickets are $85. Proceeds of the Bishop White Committee programs will benefit the East Asia Section of the Royal Ontario Museum.

ATTENTION MEMBERS

The Royal Ontario Museum Act provides for the election of three ROM Members to the Board of Trustees to hold office for a term of three years each. One of these positions will become vacant on June 30, 2017.

The incumbent, Anne Lindsey, has served one three-year term as a membership-elected trustee and is eligible to stand for a second three-year term. The vacant term of office will be July 1, 2017, to June 30, 2020. Nominations for this position supported by the signatures of 25 active ROM Members (please include membership number) should be forwarded to the Office of the Board Secretary by the close of nominations at noon on Friday, April 7, 2017. **If you are interested in pursuing a membership-elected Trustee position on the ROM Board of Trustees, please call the ROM Board Office at 416.586.5886 for more details.**

IARTS TEXTILES OF INDIA GRANT

The ROM will be launching a call for proposals for the inaugural round of applications for the IARTS Textiles of India Grant. Inspired by a passionate ROM Volunteer, Arti Chandaria (1960-2015), this biennial grant will provide scholars, curators, educators, community leaders, artists and citizen enthusiasts with an opportunity to further the preservation, documentation, understanding, encouragement, interpretation or revival of Indian textile arts. Celebrating the splendour and influence of Indian textile arts, this grant can be used anywhere in the world toward a project that enhances knowledge about Indian textiles. Meant to foster cultural understanding, institutional collaboration and public engagement, the grant has both a research and a public engagement component.

The call for proposals opens on October 1, 2016. The deadline for proposals is March 1, 2017. For more information visit **rom.on.ca/iarts**

Dale Chihuly, *Persian Ceiling*, 2012. Royal Ontario Museum, Toronto, installed 2016. Photo by Brian Boyle.

PROFILE

Reading at the ROM

FROM RARE BOOKS TO RESEARCH, LIBRARIAN **BRENDAN EDWARDS** IS THE ROM'S BOOK EXPERT

Brendan in the rare books section in the library.

BRENDAN EDWARDS

HEAD OF ROM LIBRARY & ARCHIVES

Some Members may not be familiar with the ROM Library & Archives—what is it that you do?
The Richard Wernham and Julia West Library & Archives supports the collections and research of the Museum. We consist of the Sackler Reading Room, the H.H. Mu Far Eastern Library, and the Museum Archives. The libraries acquire books, journals, and rare books that relate to the research interests of curatorial staff or that illuminate or build upon aspects of the Museum's collections. These can be classified into two categories: contemporary secondary research materials—for example, the latest issues of journals like *Costume Journal* or *The Canadian Field-Naturalist*; and books like *Silk for the Vikings* and *Bird Families of the World*. Such titles assist ROM staff in staying up to date on the most recent research in their fields, and in contextualizing their own research activities. The libraries also collect rare books, which can be thought of as museum collections in and of themselves—for example, we house titles from the private library of J.H. Fleming, the renowned ornithologist. The Archives acquires the institutional records of the ROM, as well as some papers relating to personalities closely associated with the ROM. Our archivist likes to describe the ROM Archives as "the Museum's museum."

Is the ROM library resources accessible to Members?
Absolutely. We encourage ROM Members to utilize the Library & Archives to supplement their visits to the Museum. If a particular exhibit has sparked your interest in a subject, you can be sure that the Library & Archives has additional information on the topic. We are open to the public from 10 a.m. to 5 p.m. on weekdays, except on holidays. Members can also utilize the Sackler Reading Room in the Main Library, where a number of recent magazines and journals are available to browse. The reading room also features WiFi and a charging station for your mobile device—not to mention helpful staff who will always do their best to answer your questions.

How have libraries and archives stayed relevant in the digital age?
While the digital realm has revolutionized how information is shared, print books, journals, and manuscripts will never be irrelevant. Less than five percent of the titles in the ROM Library are available in digital format, which means that if you rely only on what you find on the Internet, you're not getting the whole picture! All of our library collections are searchable through the University of Toronto Libraries catalogue.

Toronto has plenty of great libraries—what's unique about the ROM Library & Archives?
Well, to start with, more than 60 percent of the titles in the collections of the ROM Library are not held at the University of Toronto Libraries or the Toronto Public Library—that's pretty significant when you consider that UTL and TPL are the two largest libraries in Canada! And the papers and manuscripts in the ROM Archives are 100 percent unique!

What led you to the ROM?
I came to the ROM after heading up the library at First Nations University of Canada in Regina, and I've spent part of my career teaching at universities in Canada and abroad. In addition to my professional qualifications as a librarian, I'm also interested in academics and research, with a focus on the relationship between print culture and Indigenous peoples. ■

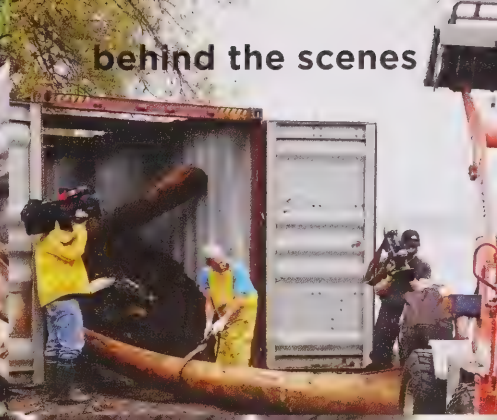
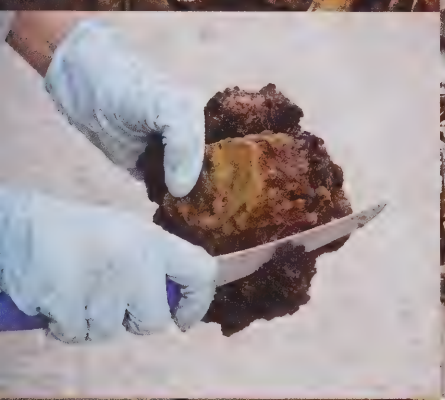
Where in the World Are They?

WHO IS WHERE—AND WHY—AMONG OUR INTERNATIONAL CURATORIAL TEAM

MARK ENGSTROM
Deputy Director,
Collections & Research

In the winter of 2014, when two dead whales washed up on the shores of Trout River and Rocky Harbour, Newfoundland and Labrador, Mark Engstrom organized a team to salvage the specimens for research and educational display purposes. This past summer, Mark accompanied ROMtravel on the exciting Circumnavigating Newfoundland cruise with Adventure Canada. The trip featured stops in St. John's, Gros Morne National Park, Red Bay, and the French island of Saint-Pierre, as well as lectures by Mark, where he discussed the flensing expedition to Newfoundland in 2014 and plans for bringing one of those blue whales to the Museum. ◘

Clockwise: Mark Engstrom holding an eyeball of the whale; Whale skull surrounded by the recovery team; Mark in Trenton, Ontario in front of the container which held the bones of the blue whale for nearly a year; The movement of the blue whale from Trout River to Woody Point in 2014.

BLUE WHALE

Preparing a whale for exhibition

By **JACQUELINE MILLER**

When two dead blue whales washed ashore in Newfoundland in 2014, their remains were salvaged and their skeletons sent to Trenton, Ontario. The bones have been in compost for almost a year. This July, we visited the site in Trenton to check up on the partially de-fleshed and defatted bones that are the result of the enzymatic activity in the compost.

The whale bones are currently undergoing a months-long degreasing process—basically a detergent bath—in which the rest of the fat is removed. Once the fat is gone, the bones will be cleaned and then assembled to mount.

While the bones are in Trenton, the salvaged heart of the whale from Rocky Harbour has made its way to Germany, to be plastinated. Plastination allows a soft-tissue specimen to be preserved for a considerable amount of time. It is a process where all the water from the tissues of the specimen is removed and replaced with polymers. With all this work happening behind the scenes, we're looking forward to seeing the whale bones on display next spring! ◘

This project is generously supported by the Louise Hawley Stone Charitable Trust, Nita and Donald Reed, and Jean M. Read.

PROFILE

GOING DARK

The culture of government secrecy and society's indifference to it are quickly becoming a troubling trend.

By **DOUG WALLACE**

With his talk at the upcoming 11th annual Eva Holtby Lecture on Contemporary Culture, part of the ROM Speaks series, constitutional lawyer and civil liberties advocate Jameel Jaffer will focus on the phenomenon of official secrecy. Zeroing in on the legal, political, and social repercussions of allowing democratic governments to withhold information about national security policy from the public.

Since 9/11, the drive to protect national security has led administrations to become increasingly secretive. With many of the big decisions—on war, interrogation, detention, and surveillance—being made behind closed doors, those who make them are essentially "going dark."

"Many of the cases I've litigated over the past decade have been attempts to pry secrets from the government," Jaffer says. "Other cases have been efforts to prevent the government from prying secrets from ordinary citizens. I'd like to talk about what's really at stake in these kinds of cases."

Born in Kingston, Ontario, Jaffer joined the staff of the American Civil Liberties Union in 2002. He has since become a committed critic of the secretive national security policies of the United States government. He was recently appointed the founding director of the Knight First Amendment Institute at Columbia University, which is dedicated to preserving and expanding the freedoms of speech, association, and the press in the digital age. Jaffer's new book, *The Drone Memos: Targeted Killing, Secrecy, and the Law* (The New Press), hits bookstores in November.

With this Holtby Lecture, Jaffer will give visitors a glimpse of what secrecy means for us as a society and as individuals. ◘

JOIN US FOR THE HOLTBY LECTURE

Jameel Jaffer will give this year's Holtby Lecture at 7 p.m. on **November 15, 2016.** The Eva Holtby Lecture on Contemporary Culture, generously supported by the Holtby and Schury families, brings powerful voices to the Museum to discuss provocative contemporary ideas. Visit **rom.on.ca/whatson** for more details.

The ROM's Managing Director of Contemporary Culture, **Ann Webb**, recently talked with Jaffer about the intersection of art and secrecy.

How do official secrecy and art intersect in contemporary culture?

Some of the artists whose work I find particularly compelling—Jenny Holzer, Trevor Paglen, Laura Poitras—share a fascination with official secrets. Some of Holzer's Redaction Paintings are based on documents declassified under the Freedom of Information Act. Poitras's film *Citizenfour* tells the story of Edward Snowden, the whistle-blower who was responsible for the most significant leak of classified information since the 1970s. Paglen took a series of chilling photographs of the once-secret CIA prisons in which agency interrogators tortured prisoners captured in the "war on terror." The photographs are incredibly powerful. By exposing what was once secret, they reclaim a grim history that was withheld from us for many years.

It's not surprising that these artists find official secrets intriguing. Every secret has a gravitational pull. As police officers know, one sure way to get a crowd's attention is to declare that there's "nothing to see here." A document that's marked with a censor's black lines will seize your attention in a way that an unredacted document won't. Anyone who has dealt with the news media knows that reporters circle secrets like moths circle a flame. Secrets draw us in. This is especially true of official secrets, which by definition belong to the privileged. To expose an official secret is to alter the balance of power between the governors and the governed.

FUNCTIONAL STORAGE

A peek at where the ROM's gems and minerals are stored

What is it?
This is the new Yamana Gold Inc. Earth Sciences Collections Care Centre and Hatch Earth Sciences Learning Lab. It features a compact storage system that dramatically increases the department's storage capacity, and is top-of-the-line in modern collection-care standards, with all enamel-coated metal cabinets and drawers.

Who works here?
The members of the Earth Sciences team work in the collections care centre at various times but the two collection managers, Katherine Dunnell and Ian Nicklin, can be found here daily.

What is happening to the space in the upcoming months?
At present we are reinstalling the 57,000 plus mineral samples—everything had to be removed from the room in order to install the system. Work is also nearly complete on the Hatch Earth Sciences Learning Centre at the front of the collection room. Although this space is not normally accessible to visitors, it's sometimes included in special tours and events. ■

The Kirwin Collection initiative is generously supported by BMO Financial Group, Yamana Gold Inc., Douglas Kirwin, Louise Hawley Stone Charitable Trust, Hatch, Rock of Ages Gala 2011, the Bogden Family, Scott and Ellen Hand, Francine and Robert Ruggles, Prospectors & Developers Association of Canada, Christopher Wansbrough, AMC Consultants, and Women in Mining Toronto.

Sharing Our City Space

URBAN LIFE CAN BE HARD FOR REPTILES AND AMPHIBIANS

By **ANDREA CARVALHO**

GET INVOLVED

You can get involved by submitting observations of reptiles or amphibians to the following:

Ontario Turtle Tally + FrogWatch Ontario
www.torontozoo.com/adoptapond

Bird Studies Canada's Great Lakes Marsh Monitoring Program
www.birdscanada.org/volunteer/glmmp

Ontario Nature's Reptile and Amphibian Atlas
www.ontarionature.org

Herpetology: the study of those who creep. Reptiles and amphibians, or "herps," often share similar habitats and behaviours, making it convenient to study the two groups together. They are both ectothermic, meaning they rely on the environment to regulate their body temperatures. Toronto is home to 24 native reptile and amphibian species. However, the city is also a place many reptiles and amphibians can no longer call home. As our city grows, both groups are increasingly susceptible to threats like habitat loss and fragmentation, pollution, and introduced species. The combination of all these issues leaves reptiles and amphibians as some of the most threatened animal groups in Canada.

In Toronto, roads are a major challenge for reptiles and amphibians, which are not fast enough to evade vehicles. Roads create barriers for animals travelling from their nesting to feeding habitats, or from winter to summer habitats. Urban predators are another challenge for animals living in the city. Household waste has allowed populations of raccoons, skunks, and cats to flourish. These predators don't stop at outsmarting our garbage bins—they have become large consumers of reptiles and amphibians. Introduced species are also common in the city. Unwanted pets released into natural areas, such as the American turtle species the red-eared slider, compete directly with native species for food and habitats, as well as spread new diseases. To meet these challenges, there is a diverse group of people who care about herps in the city. The herpetology community is anything but cold-blooded.

CANADIAN HERPETOLOGICAL SOCIETY

This year the Canadian Herpetological Society hosted its annual conference from September 16 to 19 at the Toronto Zoo. This was the largest gathering of its kind in Canada, and the ROM's Nicole Richards was on the planning committee. It was an opportunity for people passionate about reptiles and amphibians to share their research, participate in workshops, and check out local conservation efforts. The Canadian Herpetological Society works to promote research on reptiles and amphibians, support conservation projects, and increase public awareness of the threats these animals face, as well as solutions. It also provides opportunities for scientists, conservation groups, and avid naturalists to collaborate.

AT THE ROM

Bob Murphy, Senior Curator of Herpetology, has worked extensively in Ontario and abroad. He has mentored many graduate students who have added extensively to our knowledge of Ontario salamanders and turtle species. He has also contributed to the recovery plan for Ontario's Jefferson salamanders. One common thread through all of Bob's work is evolutionary explanations for what we witness today. Through genetic investigations, his lab has turned back the pages of time to discover ancient seaways in Baja California, and today he is looking forward to examining what role genes play in behaviour, physiology, and adaptations to climate change. Earlier this year, a team led by Bob discovered a

The ROM's tissue collection boasts samples from more than 19,000 species of reptiles and amphibians.

new species of desert tortoise. Using molecular data and physical measurements, they discovered that what was thought to be a single tortoise species is actually made up of three distinct species, each with its own genetic, morphological, and ecological characteristics.

The ROM's tissue collection boasts samples from more than 19,000 species of reptiles and amphibians, including elusive and endangered animals of which live specimens are not easily procured. The northern limits of many reptile and amphibian populations are in southern Ontario. Herps here face conditions that their relatives to the south do not: like our long Canadian winters. One study now under way is looking at the fecundity of the five-lined skink across latitude and precipitation gradients. The ROM was able to contribute to this research by providing specimens from the northern end of the latitude gradient.

Samantha Stevens, a Fleming College environmental visual communication student based at the ROM, will be helping bring research and conservation issues to local communities. In 2017 she heads to Caño Palma Biological Station in Costa Rica, where she will be involved in its sea turtle-monitoring project. This station is supported by the Canadian Organization for Tropical Education and Rainforest Conservation, which often has a ROM Member on its board. Sea turtles are especially vulnerable to poaching, habitat destruction, and habitat disturbances as a result of climate change. Samantha will be using photos and video stories to increase awareness and educate the local community on sea turtle conservation, as well as to share successes coming out of the monitoring projects at Caño Palma.

GET INVOLVED

Keep your eyes peeled. Scientists use observations of reptiles and amphibians to track the distribution of species and assess which areas need to be protected. This tells us what species are living in certain areas as well as what species are missing. Many can be found within the Rouge River Valley, which contains the highest reptile and amphibian diversity in the city. Wetlands along the Humber River Valley and the lakeshore are also great places to spot herps. Scientists can't be everywhere at once so they rely on volunteers or citizen scientists to report sightings.

Make your backyard a safe space for reptiles and amphibians. Be mindful of our reptile and amphibian neighbours when maintaining your garden. Pesticides and herbicides are easily absorbed through amphibians' thin skin. Naturalize your garden with native plants. Cool, dark spaces, like those under logs, and rock piles also provide shelter for frogs and toads. Backyard ponds also make amphibians and reptiles feel right at home. As our city continues to grow we need to find a balance between developing land and preserving naturalized spaces where herps can thrive. ◘

Just some of the critters you'll find in our cities

SNAPPING TURTLE
Chelydra serpentina

COMMON GARTER SNAKE
Thamnophis sirtalis

EASTERN NEWT
Notophthalmus viridenscens

DID YOU KNOW?

Amphibians are important indicators of environmental health. Respiring through their skin leaves animals like frogs and salamanders especially vulnerable to toxins in the environment. Living in both aquatic and terrestrial habitats means that our water, air, and soil need to be clean for them to thrive. Around the world, 42 percent of all amphibian species are declining in population That's a big warning sign to us that we have lots of work to do

HOW YOU CAN HELP

Groups like the Ontario Road Ecology Group are lobbying to make roads safer for the animals that cross them. You can do your part to help keep our roads safe for reptiles and amphibians:

Drive carefully, especially in marked wildlife habitats, and move animals off the road if it's safe to do so.

Responsibly dispose litter that could hurt animals or lure them close to roads.

Get involved in citizen science projects, where you can help herpetologists learn more about our local reptiles and amphibians

NWA 7680 is a mixture of rocky and metallic materials, we are still uncertain as to how it was made

Rock On

THE ROM'S **IAN NICKLIN** GIVES US THE LOWDOWN ON METEORITES

By **SHEEZA SARFRAZ**

IAN NICKLIN

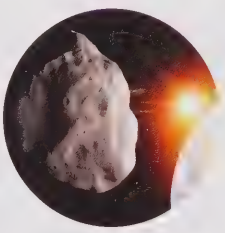
TECHNICIAN, EARTH SCIENCES

What is the difference between a comet, an asteroid, and a meteorite? Is there a difference between a meteor and a meteorite?

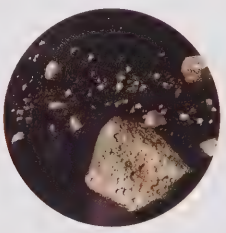
Comets are composed largely of ice. They also seem to contain some rocky material, probably mostly in the form of dust. Comets originate at the distant margins of our solar system, well beyond the orbit of Pluto. Innumerable icy, comet-like objects are believed to exist there in what is called the Oort Cloud, which envelops our solar system.

Asteroids are rocky, or in some cases metallic objects that are much closer to home than comets, mostly in the asteroid belt between Mars and Jupiter. Some are even closer still: the so-called NEOs or Near-Earth Objects. These are asteroids that have been knocked out of the asteroid belt, probably by collisions between asteroids, and sent into orbits closer to Earth.

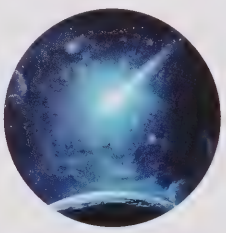
Scientists like to give things names so that we can talk about them more easily. Meteors and meteorites are such an example. In sequence, we have *meteoroid*, a rocky object orbiting in space (smaller than an asteroid); *meteor*, a meteoroid as it flies, burning, through our atmosphere; and *meteorite*, the meteor once it has landed.



COMET



ASTEROID



METEOROID

NWA 7680 was generously donated by David Gregory. Comet, Asteroid, and Meteoroid photos by iStock.

> **“Meteors hit the atmosphere at hypersonic speed: 20 kilometres per second or faster. At these speeds they become white-hot on the exterior.”**

Is a meteorite red-hot (or white-hot even) when it first lands on Earth?
No, although some debate this. There are some claims from the very few people who have actually picked up a freshly fallen meteorite that it is hot or warm to the touch, but none of these claims have been verified. There are also claims that meteorites have burned down barns, etc. The more likely reality is that they may, at best, be warm. Meteors hit the atmosphere at hypersonic speed: 20 kilometres per second or faster. At these speeds they become white-hot on the exterior. Their surfaces are melting, but because they are moving so fast, the molten material is ripped away by the intense air pressure as quickly as it forms. The heat doesn't have any time to penetrate into the interior. Eventually the atmosphere slows the meteor down to "normal" speeds—maybe a couple hundred kilometres per hour—but this is often many kilometres above the surface. It still has a long way to fall and time to cool off even if it is hot. So, no, to the best of my knowledge, meteorites are not red- or white-hot when they land.

Is there an easy way to tell an ordinary rock apart from a meteorite?
Unless you've seen the thing fall right in front of you, it can be hard for most people to judge the difference. We get a lot of calls every year asking us to identify very odd-looking, weathered rocks and pieces of slag. Many people think that magnetism is a surefire test but there are plenty of normal terrestrial rocks that contain magnetic minerals. After welcoming hundreds of visitors to our regular Identification Clinics, we have yet to have an actual, unidentified meteorite come in.

Are there certain places on Earth where meteorites are more likely to fall?
Meteors fall daily, but randomly. Most are small and burn up before hitting the ground. Since our planet is about 75 percent water, 75 percent of the rest fall in the oceans and are lost. Most meteorite hunters try to increase their odds of finding meteorites by going to places where they are most easily spotted, such as the deserts of North Africa, the Middle East, the Southwestern United States, and the cold, treeless terrain of the Antarctic.

What is the likelihood of Earth facing another mass extinction due to an asteroid or meteorite strike? Would we be able to tell years in advance?
The probability varies based on the statistical methods used, but a common estimate is that a major extinction-level impact is something like 1 in every 200 million years. However, we have been taking the threat of such impacts very seriously over the past few decades since the consequences are so dire, and we would need years to prepare a defence against such an impending impact.

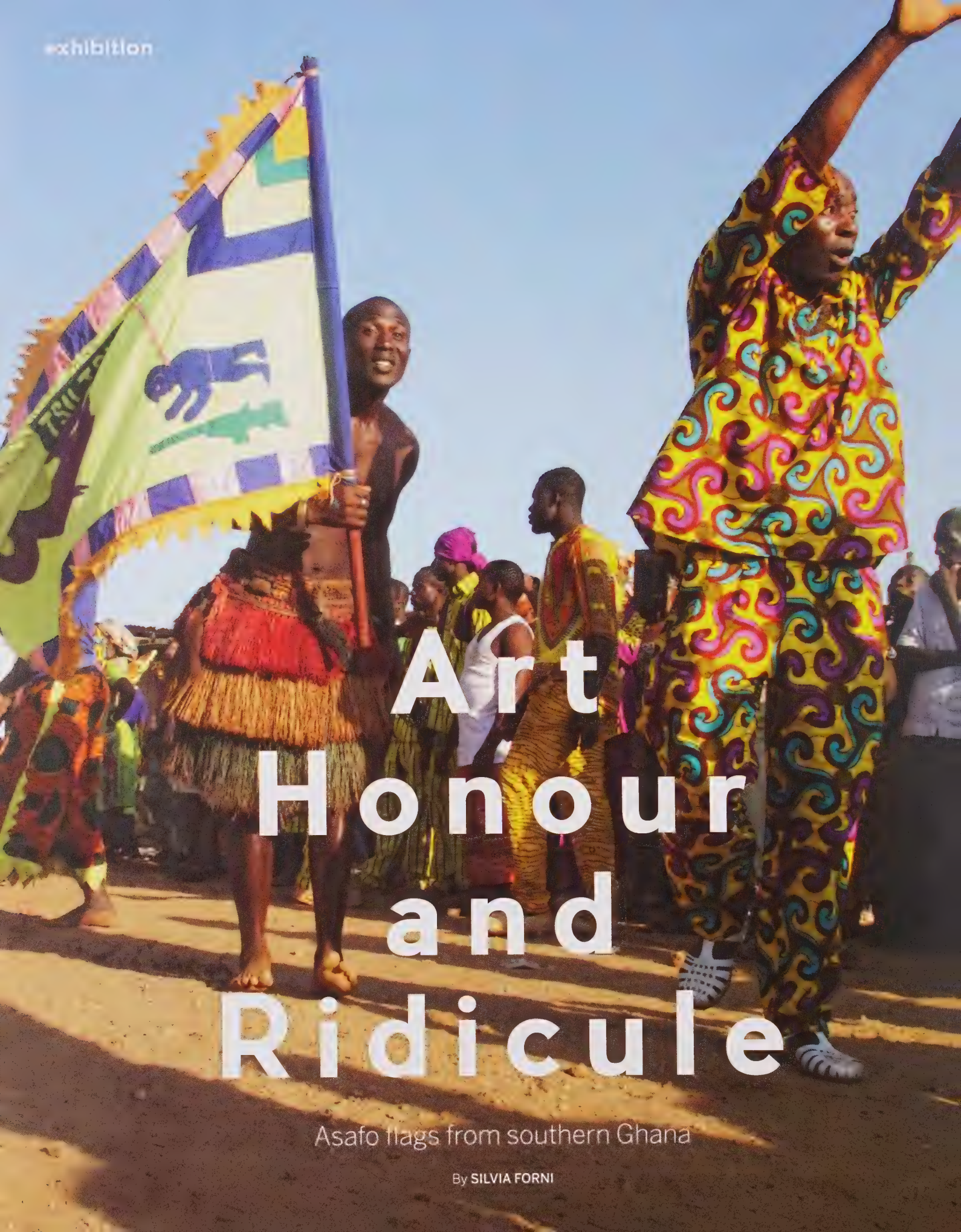
A number of space programs have been systematically searching for objects capable of such devastation. We believe we have spotted the majority of them. None of the really big asteroids (say, over a kilometre in diameter) are poised to hit us any time soon. But there are smaller ones that are harder to spot and could still do tremendous damage if they hit or explode over a populated area. The rather famous fall over the Russian city of Chelyabinsk in 2013 is a good example. That meteor is estimated to have been only about 20 metres in diameter. It exploded before landing—a relatively common occurrence—but this "air burst" released a tremendous amount of energy— perhaps as much as the equivalent of 500 kilotonnes of TNT. More than 1,500 people were hurt, many seriously, mostly by flying glass from windows shattered by the explosion's shock wave. The Chelyabinsk event was totally unexpected (and, on top of that, another asteroid about 30 metres in diameter made a close pass of Earth just hours later).So it doesn't have to be all that big, really, to do tremendous damage.

How many meteorites does the ROM have in its collection?
We have over 5,000 fragments of meteorites, ranging from under a cubic centimetre to well over 30 centimetres, which represent about 400 distinct meteorites (from different falls and finds). One meteorite may be in several pieces—such as the Allende meteorite from Mexico, of which we have 10 pieces—or we may have several specimens from one locality. Many are on display in the Teck Suite of Galleries, and we are planning a major expansion of the meteorite display, hopefully to open next year. It is, in fact, the largest display of its kind in Canada. ■

ALL IN THE FAMILY

In total the museum has 22 Martian meteorites in the collection.

The majority of the ROM's collection is generously donated by David Gregory.



Art Honour and Ridicule

Asafo flags from southern Ghana

By **SILVIA FORNI**

Asafo flags, *mfrankaa*, are performed by trained flag dancers, selected for their moral and physical strength.

The Gold Coast and Fante Society

Coastal Fanteland, once known as the Gold Coast, has been exposed to European contact longer than any other area of sub-Saharan Africa. After the Portuguese arrived on the coast in 1471, all other European maritime powers attempted to establish their presence in the area and gain control of a share of the lucrative trade in gold, ivory, and, later on, enslaved people. Indeed the concentration of trading and slaving forts along the coast of Ghana is really quite staggering, and a lasting vestige of the tragic history of trade connecting this region to the rest of the world.

Between 1471 and 1828, various European powers built slaving and trading forts on the coast, in Fante territory. Until the establishment of the Gold Coast Colony in 1872, the Europeans were mostly relegated to the forts. Local leaders and merchants kept a strict control over local politics and foreign commercial relationships. Fante states thrived as small, fiercely independent states, each ruled by a paramount chief, or *omanhene*, and a council formed by the chiefs from various subdivisions of the state.

ASAFO

sa = war
fo = people

Defining the Fante

The Fante are one of the many culturally and linguistically related groups known collectively as the Akan. With a population of around three million, they are the second-largest Akan group in Ghana after their traditional adversaries, the Asante. Akan-speaking people constitute about half of the population of Ghana and are concentrated in the southern half of the nation's territory. The Fante mostly live in the Central Region of Ghana. Their territory extends along the coast and inland from Takoradi in the west, to Senya Beraku in the east.

The term Fante is used rather loosely to refer to a number of culturally related groups of people who locally identify more specifically as Gomoa (living in the coastal area east of Mankessim), Agona (mostly located inland around Swedru), Akim (also inland, further to the east), Effutu (in the Senya Beraku and Winneba area), Assin (further inland to the north), and others.

Asafo Companies

Asafo is a military institution commonly found among Akan-speaking people. Among the Fante, Asafo companies —a sort of commoners' militia—are particularly developed and formalized. A traditional Fante state may have from 2 to 14 Asafo companies. Each company is identified by a distinguishing number, name, and location, such as Bentsir No. 1 Asafo Company, Cape Coast. Despite local variations, Asafo companies are organized rather consistently across the Fante territory.

Today, Asafo companies preserve the memory of their role as community defenders, and enact their protective role by keeping disturbance in check and maintaining peace and order in their area of town. They guard their territories, serve as a neighbourhood watch, and work for the improvement of their district and local community. The localized structure of the companies, which ties together individuals living in the same area and not necessarily connected as family, continues to provide a relevant form of engagement in contemporary society.

→

Popular Motifs on Asafo Flags

Lions

The lion is a prominent motif in Akan arts. It represents the strength and power of an individual or a group. Though indigenous to Africa, lions were not common in southern Ghana. The popularity of this motif on flags, shrines, and other art forms increased in the second half of the 19th century, inspired by European heraldic insignia.

The lion's power is often illustrated by his ability to overcome and dominate smaller animals, sometimes even the leopard. In this flag, the lion controls the entrance to a circular space where two smaller felines seem to be trapped.

Unidentified artist, Saltpond Workshop
Made for an unidentified company
around 1980
2012.65.29
Federico Carmignani Asafo Collection.

Crocodiles and Fish

Water animals and fish are common Asafo motifs. Flag iconography usually identifies the company as the predators, whether animal or human. Fish represent the quintessential clueless or hopeless prey that cannot escape its fate.

In this flag, the company leader points to a scene evoking a very common Akan proverb: "The mudfish grow fat for the benefit of the crocodile."

Kweku Kakanu, Saltpond Workshop
Made for an unidentified company
around 1940
2012.65.3
Federico Carmignani Asafo Collection.

Technical Superiority

Access to and control of technology are common metaphors used by companies to assert their superiority. Planes, ships, trucks, trains, telegraph lines, and other icons of technological modernity recur on flags, and often occupy prominent positions on company shrines (*mposuban*).

Whether small biplanes or larger, more modern aircrafts planes are a favourite Asafo motif. They salute the ability of the owners of the flag to go anywhere without any constraints.

Unidentified artist and workshop
Made for an unidentified company between
1925 and 1950
2012.65.12
Federico Carmignani Asafo Collection.

Eagles

Fabulous winged creatures often inspired by European heraldry are common motifs on flags. Double-headed eagles are powerful creatures able to see in all directions, leaving no possible escape for the enemy.

With wings fully outstretched, cannons in its talons, and cannonballs in its beaks, this double-headed eagle graphically illustrates the power and might of the company.

Unidentified artist and workshop
Made for an unidentified company between
1925 and 1950
2012.65.19
Federico Carmignani Asafo Collection.

Asafo Flags

Aside from their military function, Asafo companies are also connected to some of the most interesting and vibrant art forms of the region. Asafo companies manifest their competitive aesthetic through three main art forms: the company shrines called *mposuban* (singular *posuban*), the company flags known as *mfrankaa* (singular *frankaa*), and the ever-changing uniforms and musical performances of their members. Though many of the icons and colours found in Asafo arts recur in different locations, their meaning and significance is always connected to local interpretations, and within one state only specific groups may have access to a certain chromatic and visual combination.

Flags embody a company spirit and they are the most important and dynamic visual display of Asafo pride and power. This is emphasized in festivals, where flags are always danced by specialized flag-bearers who enter the performance space guarded by member carrying muskets. The moves of the flag dancers are also another clear reference to the battlefield. Flags are flaunted, thrown, and rolled in a choreography that powerfully evokes competition, pride, and boastfulness. The military theme of Asafo imagery is carried over into the dance, and the performers enact loosely structured plays about past battles. In a typical flag-dancing sequence, the flag is carried proudly into the field, then hidden from view in a tactical movement, wrapped around the body of the flag-bearer or rolled up and tossed to another dancer for protection, then unfurled victoriously upon success. Other moves may mock and provoke the enemy, or evoke the spirit and protection of the ancestors over the display, such as in a very dramatic ritual sequence involving the swallowing of a whole egg. The dancer may also draw "traps" on the ground to capture the enemy, all connected in a highly entertaining performance in which dancers display their talent and virtuosity.

The typical Asafo flag (*frankaa*) is rectangular, with appliquéd mirror images designed on each side. Most flags

These acquisitions were made possible by the generous support of the Louise Hawley Stone Charitable Trust.

Art, Honour, and Ridicule: Asafo Flags from Southern Ghana is on now.

Controlling Time

Keeping up with the times has been an ongoing priority in Asafo imagery. Time itself was made a highly visible statement with prominent clocks displayed on the exteriors, near the entrances, of several European slaving forts, especially Cape Coast. (The clock's cousin, the sundial, was present at Elmina.)

While it's not at all clear when these clocks first appeared, they have had a presence on at least 10 Asafo *posuban* and multiple flags for as long as can be documented. The ability to control time is a form of strength boasted by many companies throughout the region.

This flag illustrates a common motif on Asafo insignia: "We control the cock and the clock bird." This highly conventionalized saying refers to a company's ability to control the flow of time and control when things happen in their town.

Kweku Kakanu, Saltpond Workshop
Made for an unidentified company around 1950
2012.65.1
Federico Carmignani Asafo Collection.

Trees

Whether they are seen as the hiding spot for dangerous creatures or solidly stuck in the ground, trees represent challenges that may be overcome only with courage and strength. Asafo iconography usually shows them together with large animals who may or may not be able to pull them down. Interestingly, some companies identify with the trees while others associate with the animal or man who challenges them.

This complex composition shows a number of more or less dangerous characters gathering under or on a large tree. The composition goes with the saying, "Only a brave man goes under a large tree."

Kweku Kakanu, Saltpond Workshop
Made for an unidentified company between 1950 and 1975
2012.65.5
Federico Carmignani Asafo Collection.

have a geometrical border on three sides and a fringe for edging. Solid colours are most common in flag compositions, although variations in fabric, patterns, and textures can be quite broad and creative. Most Asafo flags display either the British Union Jack or the Ghanaian national tricolour adopted in 1957 on the canton (top inner corner of flag). While this transition may offer an approximate dating reference, Asafo companies have continued to commission flags with the British emblem well beyond independence, to replace older flags or as a way to increase the resale value of their emblems. These national flags are often interpreted with a great deal of artistic license in both composition and chromatic associations.

> **"Flags are flaunted, thrown, and rolled in a choreography that powerfully evokes competition, pride, and boastfulness."**

Asafo Today

Asafo companies are today a very lively and vibrant component of the life in towns and cities of the Central Region of Ghana. Developed as traditional militia in times of extreme violence and instability, Asafo companies have been quite successful in adapting and rethinking their role in response to a changing society. It is important to highlight the still-thriving creative and social relevance of Asafo companies in contemporary Fante society. In line with their historical development, Asafo companies continue to be important forces of integration both in large cities and in smaller towns. Whether they have become major tourist attractions, such as the Cape Coast Fetu Afahye, or are mostly a local affair such as the Akwambo at Gomoa Dago, Asafo festivals are important homecoming events that bring people together, reinforce family and neighbourhood ties and the sense of community pride, and promote intergenerational exchange. ■

Content adapted from the book *Art, Honor, and Ridicule: Asafo Flags from Southern Ghana* by Doran H. Ross and Silvia Forni, coming soon from ROM Press.

Louise Hawley Stone Charitable Trust.

Blown away

The ROM's collection of European glass is a virtual history lesson

1

Vase

Origin: **England**
c. 1889

Rare and intricately detailed cameo masterpiece from Thomas Webb & Sons. Turquoise glass was dipped in white, then dipped in pink, with the excess glass cut away to create the Chinese-inspired design.

By **BRIAN MUSSELWHITE**

By any standard the breadth of the ROM's glass collection is impressive, spanning an entire continent, and ranging in scope from small Medieval medallions of saints to large Rococo, Neoclassical, and Art Deco chandeliers; from simple flytraps for the middle classes to huge looking glasses for the aristocracy; from fancy centrepieces for the dining room to functional coffee pots for the kitchen. It's a very large and comprehensive collection.

In the Medieval section, a small green German beaker with applied prunts (blobs of glass) tells us of a time when most people ate roasted meats with a sharp knife and their hands. The prunts helped greasy fingers grip the glass. A fragile, colourless Venetian glass ewer from the Renaissance was probably too precious for its wealthy owners to use—which may explain why so many similar pieces survive today.

From 17th-century Holland comes a huge Römer with a large, hollow stem, while Saxony is represented by a large cylindrical Reichsadler Humpen made for display and communal drinking.

An 18th-century wheel-engraved goblet with the arms of Augustus the Strong and a large ruby 19th-century Bohemian goblet with a view of Niagara Falls add significantly to that part of the collection.

Eighteenth-century England is well represented with numerous drinking glasses and rinsers for wine glass reuse. (Using different glasses for various wines is a 19th-century invention.) From the same period, Scotland is represented by a large collection of James Tassie white-glass portraits and medallions. There are also numerous examples of Irish cut glass.

Items from the 19th century, produced by many different factories, include large collections of glass paperweights, finger bowls, and smaller groupings of glass for the dining room—pieces such as *épergnes* and other centrepieces.

The ROM collection also features fine examples from the 20th century from all of the major periods, including Art Nouveau, Art Deco, Bauhaus, and Art Moderne. There are also groupings of later Italian, Finnish, and Scandinavian glass.

America is here, too, with glass by Louis Comfort Tiffany, Tiffany Studios and Frank Lloyd Wright, and later paperweights by Paul Stankard and Victor Trabucco, among many other Americans. And the Russian-cut glass wine cooler given to the Grand Duchess Olga is a masterpiece of cutting.

Are there things missing? For sure; the ROM was late to the collecting game compared with older international museums. For example, there is nothing from late 17th-century glass maker George Ravenscroft nor anything by Maurice Marinot from the early 20th century. But who knows—as the ROM collection continues to grow, it may only be a matter of time.

Property Export and Import Act.

2
Wine Cooler

Origin: **Moscow, Russia**
Before July 1915

An exceptional example of late Slavic revival style from the Mal'tsov Glassworks, this ice bucket was a gift to the Grand Duchess Olga, sister of Tsar Nicholas II. She was one of the most celebrated survivors of the Russian Revolution, emigrating to Canada in 1947.

3
Ewer

Origin: **Venice, Italy**
Early 1500s

Soda-lime glass with enameled and gilded decoration. A rare example of Venetian glass blown extremely thin from the finest sand, so as to resemble rock crystal. Very likely used only as a show of wealth on the sideboard.

4
Wine Taster

Origin: **Possibly Venice, Italy, or the Netherlands**
17th century

This rare piece was originally thought to be a lamp, but similar examples of it appear filled with wine in 17th-century Dutch paintings. To taste the wine, the vessel would be turned so the wine would run out of the scallop, down the tubes, and onto the glass plate.

5

6

5
Paperweight

Origin: **France**
c. 1855

This Baccarat item, depicting a butterfly hovering over a flower, is one of many in the ROM's large paperweight collection. Desk items became increasingly popular as more people became literate in the mid-1800s.

6
Vase

Origin: **Sweden**
c. after 1956

This showpiece, designed by Nils Landberg, was once part of the Seagram Museum in Waterloo, Ontario. Its thin shape stretched the boundaries of glass technology, even for the 20th century.

7
Vase

Origin: **France**
c. 1900

From French Art Nouveau glass artist Émile Gallé. His factory churned out many pieces for the middle class, in order to have the resources to create items like this water lily piece for the wealthy.

8
Vase

Origin: **Klostermühle, Bohemia (present-day Czechia)**
c. 1900

Made by the Lötz Witwe Company, this mouth-blown Art Nouveau piece of pale yellow glass over clear glass—one of the largest pieces of its kind—is overlaid with metallic oxides.

7

8

CHIHULY AT THE ROM

The ROM is proud to present *CHIHULY* on now until January 8, 2017, an exhibition of the works of Dale Chihuly, one of the foremost artists working in the world of glass today.

Two pieces of Chihuly's work are also present in the ROM's collection. The Museum purchased his *Lapis and Gold Venetian with Clear Fiddle Heads and Red Neck and Base* from his Venetian series, which was the first to be in any museum collection. Through a generous donation, a piece from Chihuly's Basket series was also acquired.

This exhibition is organized by the Royal Ontario Museum in cooperation with Dale Chihuly. The work displayed is protected by copyright and any copying is expressly prohibited. This exhibition has been financially assisted by the Ontario Cultural Attractions Fund, a program of the Government of Ontario through the Ministry of Tourism, Culture and Sport. Supporting sponsors, Saks Fifth Avenue and Delta Air Lines.

Dale Chihuly, Persian Ceiling (detail), 1999. 35 x 14 1/2'. Chihuly Garden and Glass, Seattle, installed 2012. Copyright 1999 Chihuly Studio. All rights reserved. 5. Paperweight: Gift of Alice Baldwin Hall. Certified by the Canadian Cultural Property Export Review Board under the terms of the Cultural Property Export and Import Act. 6. Vase: Gift of Dan and Fran Brown through the Seagram Museum.

BASKING IN THE CARIBBEAN

Why the Caribbean is a tropical paradise for bats but not so much for other mammals

By **BURTON K. LIM**

Although the Caribbean is world renowned for its white-sand beaches and clear blue waters, I go there to study the most successful group of terrestrial mammals in this tropical paradise—bats. Other taxonomic orders known to be from this New World island archipelago either have gone extinct (such as the sloths and monkeys) or have been reduced to a fraction of their previous diversity (rodents and large shrew-like mammals called solenodons).

Along with Madagascar and the Philippines, the Caribbean is one of the top three biodiversity conservation hot spots—places where high endemism (species found nowhere else) is coupled with high loss of habitat over a small area. How high is the endemism? Of the 172 species of mammals known in the past or presently from the Caribbean, all but 20 species of bats are found only on the islands.

Today, bats account for about 80 percent of the extant (living) species of mammals in the region. Why have bats thrived while other species have disappeared with an extinction rate over four times higher? My research studies the distributional patterns and associated genetic variation of bats. It investigates their evolutionary history and colonization of the Caribbean islands from the continental mainland of North and South America.

There are several ways for species diversity to arise on islands, including vicariance (the separation of continental plates and populations forming new species) in isolation over time; island hopping, as when smaller organisms are dispersed by weather systems including hurricanes; rafting on vegetation over water; flying (for insects, birds, and bats); and human introductions.

Countering colonization of islands and speciation over time is extinction of species. Based on the fossil record, most extinct species of mammals in the Caribbean disappeared during the Late Quaternary period (over the past million years). Possible causes of extinction are climate change associated with transitions between colder glacial periods and warmer interglacial periods, the last of which occurred 9,000–15,000 years ago; prehistoric effects, such as the hunting of animals that had no natural predators following the arrival of Amerindians from the continental mainland to the Caribbean about 6,000 years ago; and historical impacts with the arrival of Europeans since 1492, beginning with Christopher Columbus.

Both the palaeontological evidence of extinct species and the archaeological record of human presence are scant and scattered in the Caribbean. Nonetheless, some general inferences can be made about colonization and extinction of mammals on the islands. For primates, the youngest fossils known are from Jamaica and are about 2,100 years old. But this predates the oldest human remains, which are about 1,200 years old. So based on the currently available evidence, it is hypothesized that the extinction of primates on Jamaica occurred prior to the arrival of humans on the island. However, the earliest humans appeared about 5,600 years ago on Hispaniola (Haiti and Dominican Republic), which is before the last extinction of primates there 3,800 years ago. Despite this overlap of existence, there is no direct evidence—such as remains associated with fire pits or bones scarred by hunting weapons—that humans caused the disappearance of monkeys on Hispaniola.

→

BATS OF THE CARIBBEAN

LEACH'S SINGLE LEAF BAT

Monophyllus redmani
Jamaica

LEACH'S SINGLE LEAF BAT

Monophyllus redmani
Dominican Republic

VELVETY FREE -TAILED BAT

Molossus molossus
Jamaica

VELVETY FREE -TAILED BAT

Molossus molossus
Dominican Republic

Similar scenarios, of humans predating the extinction of species but not causing it, are seen in the other groups of mammals. The last sloths, for example, went extinct 4,400 years ago, after the earliest known humans appeared on Hispaniola.

The most recent extinction, of the large shrew-like solenodons in the 15th century, occurred tantalizingly close to the arrival of Europeans in the New World. But there is no proof that introduced species such as rats caused the demise of the native fauna by out-competing them for resources. In fact, two species of solenodons still exist today—one in Cuba and the other in Hispaniola. Recent work in Dominican Republic has found that the endemic Hispaniolan solenodon (*Solenodon paradoxus*) is actually difficult to capture as opposed to being rare; it may be delisted if critical forested habitats can be preserved. With the help of a knowledgeable local Dominican, we found this species at several sites during a 2015 ROM-sponsored expedition to study the genetic diversity of mammals on the island.

At 58 living species in the Caribbean, bats are the area's most successful mammals. They are also more diverse than initially thought, with several widely occurring species requiring re-examination based on new genetic and morphological studies we have done at the ROM.

For example, Pallas's mastiff bat (*Molossus molossus*) was previously considered to be found throughout the Neotropics, from Mexico south to Argentina, and east to the Caribbean. Mark Engstrom (Deputy Director of Collections & Research at the ROM), his doctoral student Livia Loureiro, and I have been studying the evolutionary relationships of the species within this genus (*Molossus*). A combination of DNA study, anatomical examination, and analysis of echolocation calls in these ubiquitous insect-eating bats has identified several cryptic species—populations that superficially look alike but are actually different based on other data such as genetics. These bats, from both Jamaica and Dominican Republic, each need to be elevated to full species status.

Likewise, another species, the Greater Antillean long-tongued bat (*Monophyllus redmani*), has a lot of genetic differences between populations from Jamaica and Dominican Republic. The overall difference is almost twice as great as that between two other nectar-feeding species (the flower bats *Erophylla sezekorni* and *Erophylla bombifrons*) from the same islands. Previously recognized variations in fur colour and body size among the islands' bats were thought to be minor geographic differences in the genus *Monophyllus*. The genetic differences, however, provide support for separate species recognition.

These two examples highlight the underestimation of biodiversity in this threatened conservation hot spot. It is important to identify distinct species because each one interacts differently with the environment. *Monophyllus* is one of several nectar-feeding genera that provide essential ecosystem services in the form of pollination as they go after their sweet treats in flowers. Undoubtedly, different species of *Monophyllus* in Jamaica and Dominican Republic feed on and cross-pollinate several species of plants and thus serve as valuable cogs in forest regeneration on their respective islands.

By contrast, mastiff bats in the genus *Molossus* are voracious insect feeders that can easily eat up to half their body weight in food during the night. They keep in check the insect populations, particularly those that may do damage to agricultural crops or natural forest cover. A study in the United States estimated that insectivorous bats provide an annual benefit to farmers worth billions of dollars by minimizing the amount of pesticides added to the environment and reducing the damage to food produce.

Being able to fly has certainly helped bats disperse to islands and, in combination with their small body size and nocturnal behaviour, prevented predation and hunting from exerting the same extinction pressure that larger, diurnal animals have experienced. As they thrive, bats contribute to and maintain the Caribbean's unique and endangered habitat. ■

Photos courtesy of Burton Lim.

GROUND CONTROL

How one asteroid will help us travel 4.5 billion years into the past

Humans have been fascinated, arguably for millennia, by the question of who we are and where we come from. It has been said that you can get to know a person by the company they keep. So, to understand how Earth was born and how life began, one group is turning to a neighbour in the solar system: Bennu, an asteroid whose orbit passes near Earth.

The Canadian Space Agency is leading the nation's contribution to the OSIRIS-REx probe, part of NASA's New Frontiers program. The OSIRIS-REx probe launched on September 8, 2016, with a mission to rendezvous with Bennu. In orbit with the asteroid, it will analyze the surface and topography over an extended period. Then, in a daring flight manoeuvre, the probe will touch down and scoop up a sample of Bennu's terrain before flying away again and returning the sample to Earth for analysis.

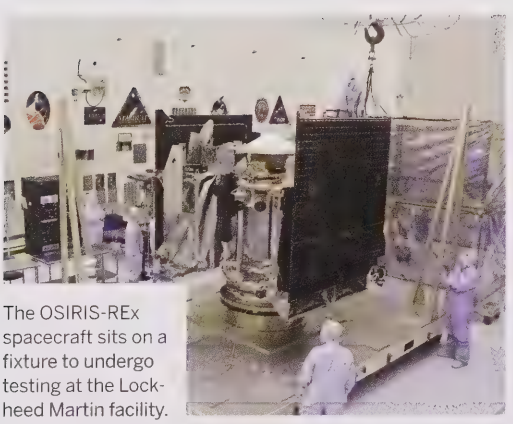
The ROM and its world-class collection of minerals and meteorites have a pivotal role to play in learning from this interstellar meeting: Baseline data used in the mission's scientific procedures will be gathered from samples in our geological collection.

The Bennu asteroid is 510 metres across—almost as tall as the CN Tower!

Image courtesy of NASA's Goddard Space Flight Center Conceptual Image Lab

HOW DOES LIDAR WORK?

Lidar or light detection and ranging, uses laser pulses to measure distances and obtain surface characteristics. In a process similar to radar, a pulse of light, usually in the infrared spectrum, is sent out toward a surface. Almost all surfaces will reflect a part of the light, and a detector records the time of the reflected pulse. The spatial relation between the laser and the detector must be precisely known so that the distance of the light path travelled can be calculated based on the constant speed of light. For each detection, a range from the detector to the surface is calculated. In coordination with GPS, a two-dimensional grid of points is tested by the Lidar sensor to provide a three-dimensional picture of surface features (in the case of a building) or a topographic map of terrain elevation. Lidar has many applications on Earth, including determining changes in vegetative cover, mapping shorelines, and creating digital elevation models and detailed street architectural representations. Lidar has even been trialled in driverless cars for collision avoidance and navigation.



The OSIRIS-REx spacecraft sits on a fixture to undergo testing at the Lockheed Martin facility.

“The chemical composition of the asteroid is key to unlocking the mysteries of the early solar system.”

THE ASTEROID

The object of the rendezvous mission is the asteroid Bennu. Selecting Bennu was a key decision for the scientific aspirations of the mission. How do you pick one asteroid out of over 500,000 in the solar system? Scientists and space engineers had to agree on selection criteria. First, in order to keep the mission to a realistic duration and increase accessibility, only Near-Earth Objects (NEOs) with orbits similar in shape to Earth’s were considered. This criterion, which improves the chances of a successful sample return, left 192 asteroid candidates. Then, any asteroids smaller than 200 m in diameter were eliminated. As an asteroid’s size increases, the rate at which it spins decreases, simplifying spacecraft dynamics for orbiting and rendezvous. Also, a larger asteroid offers a greater potential number of sites for sample acquisition. All but 26 candidates were knocked out at this stage. (Bennu, with a diameter of approximately 500 m, was still in the running.) Finally, the chemical composition of the asteroid is key to unlocking the mysteries of the early solar system. Bennu, as well as four other asteroids among those that remained, is carbon-rich: They have significant quantities of organic (i.e., carbon-based) materials, including amino acids, indicating that they are old (more than 4 billion years) and their geological material has not undergone dramatic changes during their lifetimes. They have preserved the conditions present when the solar system was formed. Based on the combination of its orbit, size, and composition, Bennu was considered the best target out of all the possibilities.

THE MISSION

The probe launched in September 2016. A two-year trip around the Sun will align the orbital paths of OSIRIS-REx and Bennu for rendezvous. Then, for nearly a year, mapping activities carried out in close proximity to Bennu will gather comprehensive geological data. Once potential landing sites are mapped in detail, one will be selected for the probe’s “touch and go” manoeuvre. It will capture a sample of regolith (asteroid dust and gravel) weighing approximately 60 to 2,000 g before disengaging from Bennu. The sample will then be returned in a capsule to Earth, landing in the Utah desert in 2023.

Artist rendition courtesy of MacDonald Dettwiler and Associates Ltd. Photo courtesy of Lockheed Martin Corporation.

THE SCIENCE

The OSIRIS-REx mission has three main scientific objectives. The first is to create a three-dimensional topographic model of the asteroid. This model will shed light on the surface features of Bennu. Is it hilly? Is it smooth or granular? Are there valleys or pockmarks? The answers will paint a picture of its formation and subsequent geological changes, such as impacts with smaller objects over its lifetime. In contrast, when meteorites are found, they have already undergone some extreme chemical transformations due to passing through Earth's atmosphere at high temperature. The Lidar topographic mapping of Bennu and the regolith sample retrieval from its surface allow for the examination of a pristine extraterrestrial specimen.

Second, scientists hope that the asteroid will be like a prehistoric animal frozen in suspended animation. The vacuum of space has preserved Bennu for over 4 billion years. Scientists want to analyze the carbon-based material it is composed of. They expect to find amino acids—organic materials that are the basis of life on Earth—and to learn more about how the organic compounds may have been distributed throughout the solar system.

Third, the Yarkovsky effect will be measured by OSIRIS-REx while it is in formation with Bennu. This effect theorizes that the spin of an asteroid produces a change in momentum that could perturb its path through space. The data will improve trajectory prediction of asteroids and comets and also increase knowledge of astrodynamics.

THE CANADIAN CONTRIBUTION TO OSIRIS-REx

The Canadian Space Agency (CSA) is collaborating with NASA in the OSIRIS-REx mission and is responsible for the development of the OSIRIS-REx Laser Altimeter (OLA). OLA, based on Lidar (see previous page), has multiple roles in the mission. For example, it will guide the probe's navigation as it enters close formation with Bennu. Most importantly, OLA will undertake a complete mapping of the asteroid's topography. The topographic maps will also be used by scientists to select potential landing sites for OSIRIS-REx's quick trip to the surface.

The Canadian team is led by OLA instrument scientist Dr. Michael Daly from York University. The Universities of British Columbia, Calgary, Toronto, and Winnipeg are collaborating on the project as well. Previous experience on Canada's Mars Phoenix Rover team has provided the foundation for OLA. MacDonald Dettwiler and Associates (MDA) in Ontario has designed and manufactured both instruments, and will be responsible under the CSA for testing OLA before integration into OSIRIS-REx.

For its participation, Canada will receive four percent of the retrieved sample from Bennu. This material will support homegrown research into the creation of the solar system over many years. The samples will be tested by multiple methods including spectroscopy. The ROM is providing samples from its geological collection, both Earthbound specimens and meteorites, to help hone the scientific procedures and provide baseline data for comparison. With this support from the ROM, Canadian scientists can maximize the use of what is a very precious sample of asteroid material.

THE PAST AND THE FUTURE

A rendezvous with Bennu allows us a glimpse into the very distant past. OSIRIS-REx is expected to provide data on how organic compounds that are the components of life forms on Earth may have travelled across the solar system. The mission is also addressing challenges that may come in the future. For example, by understanding the gravitational forces that determine the shape of Bennu's orbit, we can predict if it or another NEO is likely to impact Earth. Finally, at some point natural resources on Earth may become scarce, and asteroids may become viable sources of metals and minerals. The development of the complex flight dynamics and navigation techniques for the OSIRIS-REx trajectory and rendezvous will support for these off-planet mining missions.

This mission is chock full of exciting opportunities to expand our knowledge of the solar system. Collaboration on this unique rendezvous between Canadian and American scientists and engineers, through the CSA and NASA, is opening up a new window on space and time. With the expertise of its curators and research staff, founded on a world-class collection of meteorites and meteors, the ROM anticipates engaging our neighbour for many years to come as we learn more about Earth, our home. ◘

AN INTERVIEW WITH

KIM TAIT

Teck Endowed Chair of Mineralogy

By **MARIANNE MADER**

Describe your role on the OSIRIS-REx mission.
I'm a collaborator on the science team for Canada. There are six scientists from across Canada participating on the mission and I'm happy to represent the ROM.

What is the most exciting possibility that might come out of the mission?
This is the first time that Canada has participated in an asteroid sample return mission—that alone is exciting. Scientifically, I would probably spend the rest of my career working on what we learn from even small dust grains. There will be so much to learn from asteroid material collected from the source.

What are the main differences between rocks on Earth and meteorites and asteroids?
They are surprisingly similar mineralogically. Earth is a very dynamic planet with an active crust that is constantly recycling rocks and minerals, so the specimens lose some of their original information. Rocks from Bennu have literally been "frozen" in time, giving us a rare snapshot of the rock record from over 4.5 billion years ago, a time that we can't see in rocks on Earth.

What might Bennu tell us about the geology of Earth?
Because Bennu's rocks are from a geological past that we can't access on Earth, they can give clues to what the solar system was like more than 4 billion years ago.

Marianne Mader is the Hatch Managing Director of the Centres for Earth & Space and Fossils & Evolution.

ROMTRAVEL

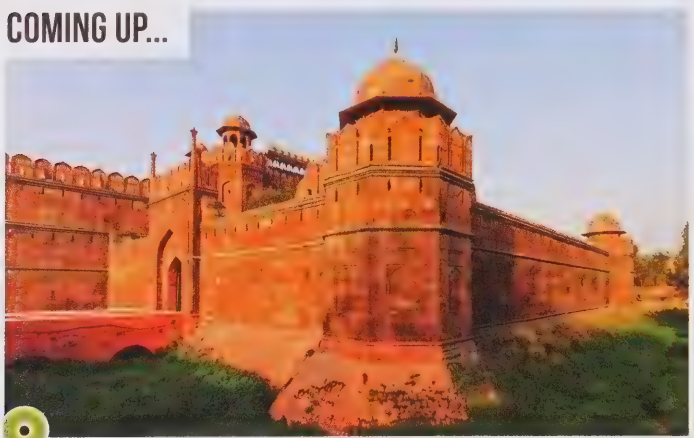
NOVEMBER 5 TO 18, 2017

JAPAN

MEDIEVAL, MYSTERIOUS AND MODERN

Explore bustling Tokyo and its Imperial Palace. Travel through the Japanese Alps and stay at an *onsen* hot spring. Marvel at the shrines and temples of the ancient capital of Kyoto. Visit renowned gardens and savour the secrets of the tea ceremony. Discover the customs of the samurai warriors and the geisha. Enjoy this intriguing feast of culture, tradition, and food again a spectacular backdrop of fall colours with the ROM's Japan expert and librarian Jack Howard.

COMING UP...



NORTHERN INDIA

It's vibrant, enchanting, mystical, chaotic, and full of dichotomies. Join ROM curator Deepali Dewan to explore India's multi-faceted history, traditions, and culture.

FEBRUARY 13 TO MARCH 2, 2017

NORTHEAST ITALY

Palladian villas in the Veneto, charming Verona, the wonderful food of Bologna, and much more await us! Led by Renaissance historian Dr. Ken Bartlett.

MAY 8 TO 19, 2017

ROMWALKS

DISCOVER YOUR CITY & BEYOND

Look for the purple umbrella at the ROMwalks meeting place!

Join fellow ROM Members and see Ontario in a new light

KENSINGTON MARKET

A walk through Kensington Market, mixing memories of times past with elements of the very modern urban environment.

Sunday, October 9, at 2:00 p.m.

TRINITY COLLEGE CHAPEL

This walk features the architecture and art of the University of Toronto's beautiful Trinity College Chapel.

Wednesday, November 16, at 1:00 p.m.

JARVIS STREET

The Toronto Necropolis was established in 1850 and is one of the city's oldest and most historic cemeteries. Its picturesque location, collection of sculptures, and Victorian buildings also make it one of the most beautiful cemeteries in the city. Some of Toronto's finest examples of High Victorian Gothic architecture can be found in the fully restored entrance, chapel, and office. Beautiful stained-glass windows grace the interior of the chapel, which is a popular choice for services.

Saturday, October 15, at 1:00 p.m.

DISTILLERY DISTRICT

Tour of the Distillery District, including a visit to the Corkin Gallery, recognized worldwide for its contribution to contemporary art discourse. Time permitting, the tour will include a visit to a ceramic studio and time to stroll through the Christmas Market. Includes a Soulpepper Theatre matinee.

Members, $110; Public, $120
Wednesday, December 7

ROMBUS

NIAGARA-ON-THE-LAKE

Spend an autumn day in picturesque Niagara-on-the-Lake and hear ROM curator Corey Keeble describe the stained glass and historical highlights of this lovely town. After lunch, enjoy a Shaw Festival production of *Our Town* by Thornton Wilder.

Members, $110;
Public, $120
Wednesday, October 5

Please notify the Programs Department at 416.586.5797 at least three weeks in advance of any special dietary needs or mobility issues.

Unless otherwise stated, ROMwalks tours are free and offered exclusively to ROM Members. All ROMwalks and ROMbus events require **registration, as space is limited**. Register at **rom.on.ca/members/events or 416.586.5700**. Walks last approximately 1.5 to 2 hours.

CHINA

Uncover the roots of Chinese civilization along the Yangtze River, the essence of China. The ROM's guest curator Sara Irwin will share her passion and knowledge about the art and culture of China.

SPRING 2018

TRAVEL WITH US

For information on upcoming trips, contact ROMtravel at

416.586.8034

travel@rom.on.ca

rom.on.ca/travel

PROFILE

Morning Man

YOUR MORNING ANCHOR **BEN MULRONEY** SHARES HIS FAVOURITES

A veteran of entertainment reporting, Montreal-born Ben Mulroney is an expert in his industry and is regarded by many Hollywood stars—north and south of the border—as a friendly face and a respected journalist. Celebrating his 15th anniversary with CTV's *etalk*, he has gained success across Canada, and now he's hosting the CTV morning show *Your Morning*, which made its debut in August. When he's not working, he's spending time with his young family: wife Jessica Mulroney, a fashion designer and stylist; their two twin boys, Brian Gerald Alexander and John Benedict Dimitri; and their daughter, Isabel Veronica (Ivy). After a recent visit to the ROM, we connected with Ben to hear about what he and his family enjoyed most about their visit.

If you could bring one person to the Museum with you, who would it be?
I can't wait to bring my daughter—she is a sponge for information and I know she won't be able to get enough of the animals.

What inspired your first visit to the ROM?
I remember visiting as a child, but the addition of the Michael Lee-Chin Crystal caught my attention. I followed the construction—and controversy—very carefully. I think the addition has been a net benefit to the Museum and indeed the city.

How often do you visit the ROM?
I'd say about twice a year; my kids need their fix of dinosaur bones, after all!

Is there a favourite object in the Museum that stands out to you as something you would like to have in your own home (or possibly loan to someone else)?
There are a few things in the Kirwin Collection that would fit nicely in my house!

Are there specific places in the Museum you find yourself coming back to visit?
Two words: *Tyrannosaurus rex*.

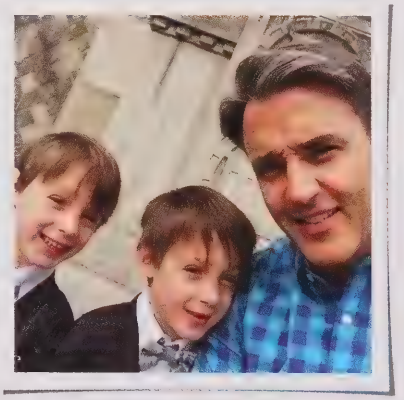
If you were to plan a day out at the Museum with your family, what would you plan to do before and after your time spent at the ROM?
Breakfast at home, big coffee in the car on the way down (absolutely necessary), three hours touring our favourite kid-friendly galleries (bring goldfish crackers for the kids), then walk along Bloor, cut through Yorkville, and eat lunch at ONE, Sassafraz, or Café Boulud. Then go home and sleep it off!

How would you describe the ROM to a friend who has never visited before?
Imagine everything you were curious about when you were a kid, all in one place.

Do you visit other museums and galleries when you travel? Could you tell us about a favourite?
I do my best to visit museums when I can. The last one I saw was the Musée de l'Orangerie in Paris. The natural light pours in and bathes Monet's work, and you just need to sit and take it in.

What word can be used to describe your experience at the ROM?
Fulfilling. ◘

ROM MEMBER
BEN MULRONEY



Ben and his twin boys, Brian and John, spending quality time at the ROM.

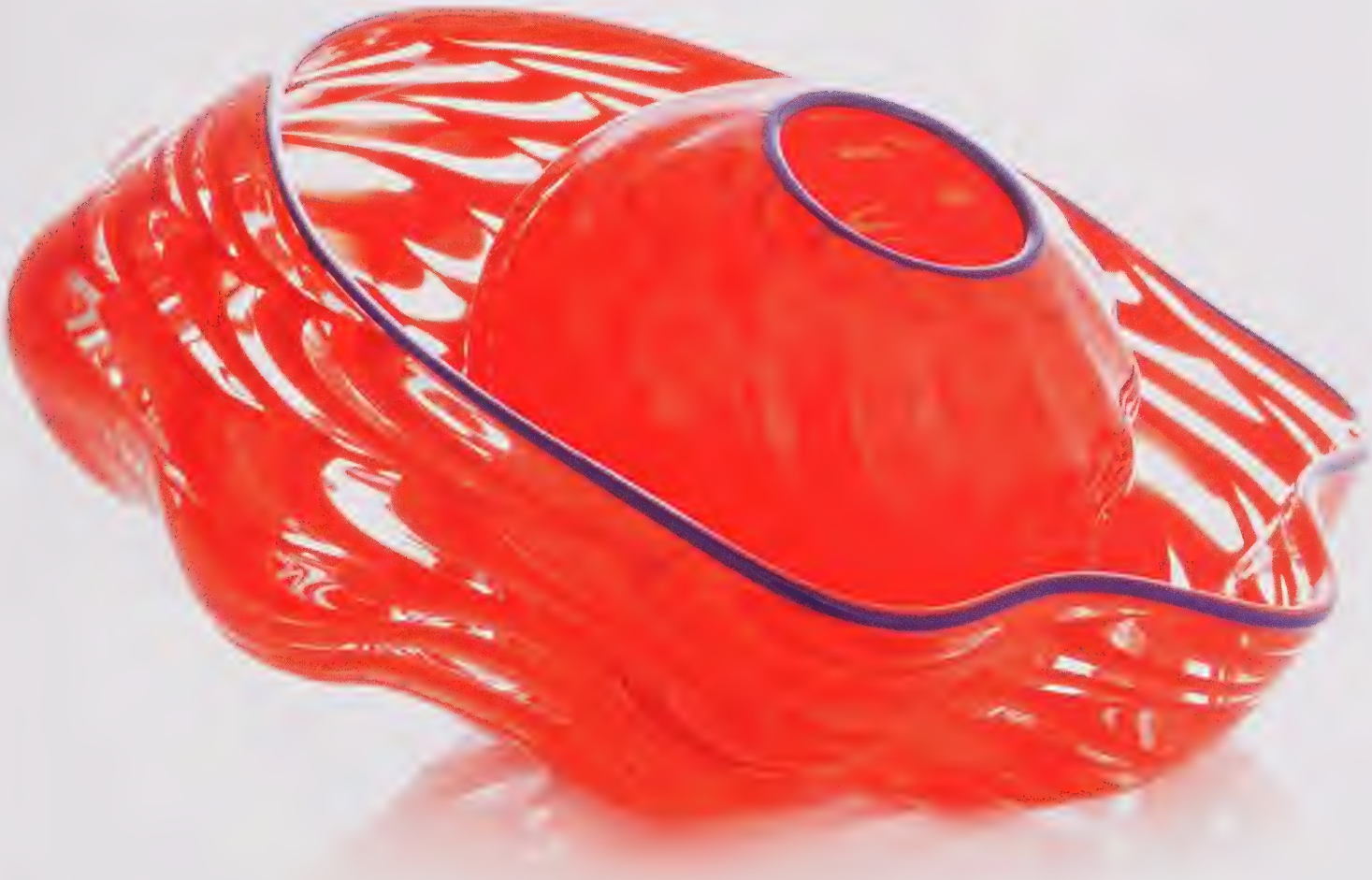
Ben Mulroney photo courtesy of Bell Media. Instagram photos courtesy of Ben Mulroney.

GIVE CHIHULY STYLE

Reflecting on the properties of glass, Dale Chihuly notes, "You can blow it and make fine art of human breath. It's like being able to manipulate water." The yielding and supple forms of the artist's *Seaform* series (an example is shown below) proved fertile ground for him to implement a technique he observed during his apprenticeship at the Venini factory in Murano, Italy: the body wrap. The application of these thin, sinuous ribbons of colour to the body of the form further enhanced the aquatic simile of this series.

WHERE TO FIND IT

The *Star Fire Seaform* and other Chihuly items are available for purchase in the ROM Boutique. For more information call **416-586-5766**.



Star Fire Seaform, $7,800, measures approximately 25 centimetres, with Chihuly's signature engraved into the glass.

ROM Members' discount does not apply to Studio Edition glass and limited edition prints.

Photo courtesy of Chihuly Studio.

PERFECT FOR GIFT GIVING

Chihuly Workshop includes a range of items, from books to logoed carry-on bags to limited edition blankets from the Pendleton Woolen Mills.

WHERE TO FIND IT

Chihuly items are available for purchase in the ROM Boutique. For more information call **416.586.5766**.

Members: Get 10% off in-store and online at rom.on.ca

1

2

3

4

6

5

1 Wrap
Chihuly Pendleton **Blanket** No. 12, $650.

2 Draw
Chihuly Pure Imagination **Coloured Pencil Set**, $25.

3 Read
Chihuly: 1968-2014, **Volumes 1 & 2** (Set), $172.

4 Wear
Pure Imagination Lobster Kids' **T-Shirt**, $30.

5 Carry
Chihuly Large Turquoise **Carry-On**, $145.

6 Cover
Pergola **Umbrella** (stick or folding), $45.

Photos courtesy of Chihuly Studio.

rom governors

creating the next century together

SMALL DONATIONS, BIG SPLASH

You can be a part of it

The ROM installed a life-size cast of the mighty *Futalognkosaurus* in the Hyacinth Gloria Chen Crystal Court in 2012. One of the largest land animals ever to have walked the Earth, it often gives visitors their first moment of wonder and awe as they enter the Museum.

Whales, like giant dinosaurs, have long captured the public's imagination. This was certainly the case in 2014, when a ROM team recovered a blue whale that washed ashore in Newfoundland.

It was nothing short of a massive undertaking, and a captivating story that went viral around the globe. Enabled by your generosity, the ROM seized an unprecedented opportunity to study this magnificent, endangered species.

Blue whales are among the largest animals to have lived on Earth—their tongues alone can weigh as much as an elephant. They have a fascinating evolutionary history that challenged even Darwin and highlights the urgent need for conservation of marine life and habitats.

This important research continues at the Museum and now you can be a part of it! By supporting the Blue Whale project in a small way, you can join hundreds of donors in an effort to bring the blue whale to the ROM and participate in a massive expression of our thanks.

I hope you will join our epic journey with the ROM's blue whale and lend your support to this exciting and worthy project. To learn more, turn to page 14, visit **rom.on.ca/makeasplash**, or call us at **416.586.5842**.

Susan

SUSAN HORVATH
PRESIDENT & CEO
RPC FELLOW

Photo by Sian Richards.

HOLE-IN-ONE!

Special thanks to our supporting sponsor, Semple Gooder Roofing Corporation, and our many generous partners, participants, and committee members for making the inaugural ROM Classic Golf Tournament a huge success on September 12! Together, we raised $100,000 net in support of the ROM.

BECOME A ROM CORPORATE MEMBER!

Corporate membership at the Museum offers a multitude of exciting experiences for employees and clients, special privileges, and unique benefits, including free admission, exhibition previews, and behind-the-scenes tours. Support from our corporate community is vital to the ROM's ability to offer world-class exhibitions and public programs. Visit **rom.on.ca/corporatemember** or contact **corporate@rom.on.ca** or **416.586.5736** for more information.

GET IN TOUCH

416.586.8055
susanh@rom.on.ca
rom.on.ca/support
@SusanH_ROM

JOIN TODAY

To join or to learn more about the Young Patrons Circle or Royal Patrons Circle, please visit **rom.on.ca/patrons** or contact **jessicah@rom.on.ca** or **416.586.8003**.

EVENTS

FACT OR FICTION

Become a ROM Patron to play!

The ROM's beloved signature guessing game is back on October 20, 2016. Exclusively for Patrons, this unforgettable event will feature hilarious guessing games and riveting conversations with ROM experts.

Scorecards in hand, participants examine unusual objects from the ROM's vast collection while our clever curators present two plausible descriptions for each. It's up to the players to determine the true nature of the mysterious objects for a chance to win a stunning, 3D-printed skull of *Corythosaurus*!

Become a ROM Patron by October 7 for your invitation to play! ROM Patrons enjoy behind-the-scenes tours, private parties, exhibition previews, early access to programs, and more.

Event Sponsor

HATCH

Event Partners

ICON

KIM CRAWFORD

OLIVER & BONACINI EVENTS AND CATERING

Photos by Ryan Walker.

SUNDAY, OCTOBER 16, 2016

Get ready to run or walk in the **Scotiabank Toronto Waterfront Marathon** in support of the ROM! Join us for a fun-filled day or make a donation in support of your favourite curatorial department or research project–100% of funds raised by ROM teams benefit the Museum!

Visit **rom.on.ca/run** to sponsor a ROM participant or to register for the 5 KM, half or full marathon.

YOUR DONATION, YOUR ROM
HELP US MAKE
A BIG SPLASH
AT THE ROM!

DONATE TODAY

Visit **rom.on.ca/makeasplash** today to get started.

The ROM's Blue Whale Recovery and Research Project continues, with a plan to present the blue whale to visitors at the Museum in 2017.

Here's your chance to be a part of it! A $40 donation from you can help make this project possible. In recognition of your support, your name will be printed on a massive installation to be displayed prominently at the ROM next year. Help us bring this extraordinary project closer to reality today—and experience a whale of a thanks! ◘

Campaign Sponsor

EQ Bank

Earl of Pembroke's Armour

The ROM's Pembroke armour is a true work of artistic genius, combining functionality, superb craftsmanship, and elements the taste and fashion of the Tudor era.

This is a surviving suit of armour made at Henry VIII's famous Greenwich royal workshop by the great master armourer Erasmus Kirkener for William Herbert, 1st Earl of Pembroke.

Composed of overlapping horizontal lames of steel held together by internal leather straps and sliding rivets, the breastplate and backplate are known as an "anime." This anime is one of only three that survive in public collections. The Pembroke armour would have formed the main part of what was known as a "small garniture," which could be made up for infantry or cavalry use.

The anime shows affinities with the fashion of the 1550s—its waistline and silhouette have the same shape as a jacket or doublet. This custom-made armour records the physical dimensions of a Tudor aristocrat. ◘

WHERE TO SEE IT

Samuel European Galleries
Level 3, Hilary and Galen Weston Wing

Invite your guests to explore the world of art, history, and culture at the Royal Ontario Museum, Canada's premiere event venue.

Featuring four exceptional caterers:

DANIEL ET DANIEL

L-EAT CATERING

OLIVER & BONACINI

PRESIDENTIAL GOURMET

BOOK YOUR EVENT TODAY!

events@rom.on.ca
416.586.5572

ROM

Immerse yourself in a spectacular exhibition by one of the world's foremost artists working in glass today.

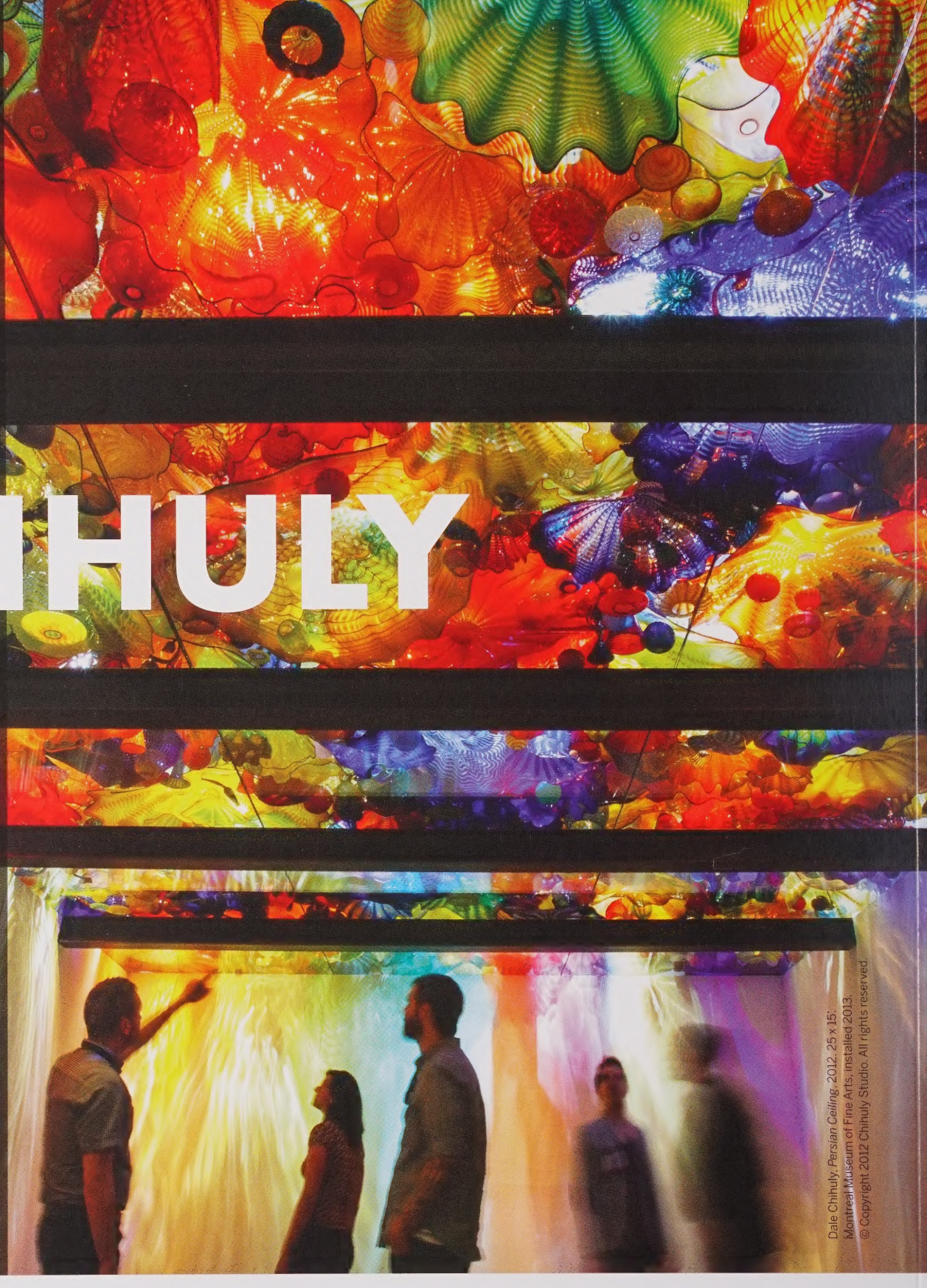
Created by sand, fire, and human breath, these brilliantly coloured works of art produce a magical, sensory experience that will never be forgotten.

CHIHULY

"No other substance transmits light, colour, and form as beautifully as glass."

—DALE CHIHULY

ON DISPLAY UNTIL JANUARY 8, 2017



Dale Chihuly. *Persian Ceiling*, 2012. 25 x 15.
Montreal Museum of Fine Arts, installed 2013.
© Copyright 2012 Chihuly Studio. All rights reserved.

SUPPORTING SPONSORS

Saks Fifth Avenue

DELTA

MEDIA PARTNERS

TORONTO STAR
thestar.com

CTV

GOVERNMENT PARTNER

OCAF FMCO ONTARIO CULTURAL ATTRACTIONS FUND
LE FONDS POUR LES MANIFESTATIONS CULTURELLES DE L'ONTARIO